THE IRON TRADE REVIEW

Volume XLVIII CLEVELAND, JUNE 8, 1911 Number 23

Period of Waiting Follows Price Reductions

Many Contracts Held Up, Buyers Hoping for Still Lower Prices— Pig Iron Production Reduced, Principally by Steel Companies

As is usually the case when price reductions are made, a waiting period has set in and the orders placed during the past week show a sharp decrease, compared with even the moderate business of preceding weeks. The postponement of placing of contracts is particularly noticeable in structural material.

Blast Furnace Production

The total output of blast furnaces for May was 1,869,883 tons, a decrease of 175,021 tons, compared with April. The daily average for May was 60,319 tons, a decrease of 7,844 tons. Non-merchant furnaces reduced their output in May 142,441 tons, compared with a reduction of 64,000 tons in April. Merchant stacks reduced their output in May 31,596 tons, as against an April reduction of 55,000 tons. On the last day of May, there were 206 furnaces in operation, compared with 220 on the last day of April. One of the South Chicago furnaces of the Illinois Steel Co. was blown in the past week, bringing the total furnace activities of the United States Steel Corporation's subsidiaries to 63 per cent. The ingot capacity of the Corporation in service is slightly larger than the present furnace output and pig iron stocks show some decline. The average ingot capacity of the Corporation in operation during the first five months of the present year was slightly better than 63-1/3 per cent. The low level of the January operations, when the ingot capacity was down to about 40 per cent, has considerably cut down the average for the five months.

Pig Iron

An eastern steel company has purchased about 25,000 tons of basic for third and fourth quarter delivery, and pipe companies are inquiring for a considerable tonnage in the eastern territory, but with these exceptions, the pig iron market shows fewer signs of activity than for many months. Southern prices are still softening, but in other parts of the country, prices are well maintained.

Structural Material

New tenders are being submitted for the 36,000 tons for the Hell Gate bridge, and similar action is being taken in regard to numerous smaller contracts throughout the country, owing to the recent reduction of $1 per ton on structural material. Among contracts awarded were the Otis building, Chicago, 5,900 tons, to the American Bridge Co.; 2,500 tons for Pearl Harbor improvements, Hawaiian Islands, to the United States Steel Products Co.; Y. M. C. A. building, Cleveland, about 1,500 tons, to T. H. Brooks & Co., at $65,750; American Express Co. building, New York, 1,200 tons, to the Eastern Steel Co.

Prices

On products on which reductions were announced last week, the new quotations seem to be pretty well maintained on the limited amount of business placed. New price reductions include from $2 to $3 a ton on oil country pipe, bringing quotations on this material to the basis established Oct. 1, 1910, for merchant pipe, and the reduction of $2 a ton on forging billets. New discounts on shafting have been announced, showing reductions of $3 per ton, but these new quotations are really only the giving of formal recognition to prices which have prevailed for some time.

Plates a Sheets

The plate manufacturers making sizes competing with certain gages of sheets, on which very heavy reductions have been made, say that they will be forced to shade the 1.35c quotation on plates to meet competition. Some sheet manufacturers, who were not consulted about recent reductions, are also dissatisfied.

Railroad Buying

The Baltimore & Ohio railroad has ordered 23,050 tons of steel rails, divided among the Carnegie, Illinois, Cambria and Bethlehem Steel companies. The Missouri Pacific is in the market for 50,000 tons, and the American Locomotive Co. has booked eight locomotives for Japan, six of which are for government railroads, and two for the Imperial Steel Works. The Queen & Crescent is figuring on about 1,200 freight cars, but a very limited inquiry for railroad rolling stock is pending.

Coke

The sale of coking coal properties of the Pittsburg Coal Co., including about 1,000 ovens with a monthly production of about 55,000 tons to the United States Steel Corporation, will probably have a good effect upon the market, as the output of these ovens will no longer be for sale. Production in the Connellsville region is being curtailed, and the total output for the region for the second quarter will be about 3,500,000 tons, compared with 4,200,000 for the first quarter.

WORLD'S IRON MARKETS

PITTSBURG

Price Reductions Do Not Stimulate Market—Pig Iron at Standstill.

Office of THE IRON TRADE REVIEW,
2148-49 Oliver Bldg., June 6.

With the possible exception of sheets, the lower prices, which became effective June 1, have not brought out much additional business in the Pittsburg territory, and in some respects the market as a whole is quieter than ever. The total volume of business booked since May 31 is light and specifications in some instances show a further decline. Owing to the fact that jobbers' stocks were extremely low on June 1, and that few contracts had been made for the third quarter, several companies report a fair gain in orders for sheets during the past few days. The reduction of from $3 to $4 a ton in the price of sheets has been carried throughout the entire list of differentials on black, galvanized and blue annealed sheets, as well as painted and galvanized roofing sheets. Some contracts for steel bars have been placed at 1.25c, Pittsburg, for delivery over the year, and, while the tonnage involved is not heavy, buyers are showing more interest in the situation. The cut in prices appears to have checked the markets on plates and shapes.

In addition to the price reductions announced last week, a new price card on oil country goods has been issued, showing a reduction of from $2 to $3 a ton, bringing quotations on this material down to the basis established on Oct. 1, 1910, when the prices on merchant pipe were reduced; the price of forging billets has been cut $2 a ton, the new quotation being $26, Pittsburg, and a new card on shafting has been put into effect. Wire manufacturers are showing a disposition to maintain present prices. No action has been taken regarding lower prices on pipe and tin plate. The pig iron market is extremely quiet. Clinton furnace, Pittsburg, has been blown out and Rebecca furnace at Kittanning, Pa., will be blown out within a few days. Production of coke is being curtailed and the total output of the Connellsville field during the second quarter is not likely to exceed 3,500,000 tons, as compared with 4,200,000 tons for the first quarter. The scrap market has quieted down, although prices show no material change.

Pig Iron.—The pig iron market is practically at a standstill. Sellers apparently have given up hope of interesting consumers in forward requirements under present market conditions. Production of pig iron is gradually being curtailed. Clinton furnace of the Clinton Iron & Steel Co., Southside, Pittsburg, was blown out June 5, and Rebecca furnace, of the Kittanning Iron & Steel Co., Kittanning, Pa., will be blown out about June 10 or 15. No. 3 stack of the Eliza group of the Jones & Laughlin Steel Co., was blown in May 30. Practically all furnace interests are asking $13.25, valley, as the minimum on basic. Two or three sales of basic in 500-ton lots for early shipment were made about a week or 10 days ago on a basis of $13.10, valley, but these lots were sold under what might be termed "forced sales," having been taken in exchange for scrap and these sales do not represent market conditions. Recent developments would indicate that the Bessemer market is firm at $15, valley, and no sales have been made below this figure. Notwithstanding reports of low prices on No. 2 foundry pig iron, several sales have been made since June 1 at $13.75, valley. In all cases consumers of foundry iron are buying in from 50 to 150-ton lots to cover urgent needs. Some of the largest consumers will be obliged to enter the market shortly for moderately heavy tonnage, but so far there has been no important buying for forward delivery. Eastern interests are still in the market for small lots of malleable, but no contracts have been made. The gray forge market is quiet and weak. We quote the market as follows:

(Prompt Shipment.)

Bessemer, valley	$15.00
Bessemer, Pittsburg	15.90
Basic, valley	13.25
Basic, Pittsburg	14.00
No. 2 foundry, Pittsburg	14.65
Gray forge, Pittsburg	13.90
Malleable, Pittsburg	14.15

(Third Quarter.)

Bessemer, valley	$15.00
Bessemer, Pittsburg	15.90
Basic, valley	13.25
Basic, Pittsburg	14.15
No. 2 foundry, Pittsburg	14.65
Gray forge, Pittsburg	13.90
Malleable, Pittsburg	14.15

Ferro-Alloys.—Aside from a few scattered sales of ferro-manganese in from 50 to 100-ton lots for western shipment, there is little activity in this market. One of the sales includes 100 tons for last half shipment at $36.75, Baltimore. There is little inquiry for 50 per cent ferro-silicon.

We quote ferro-manganese at $36.50 to $37, Baltimore, for prompt and forward delivery. The freight rate from Baltimore to Pittsburg is $1.95 per ton.

Fifty per cent ferro-silicon is quoted at $52.75 to $53.75, Pittsburg, for prompt and forward delivery; 12 per cent, $25; 11 per cent, $24; 10 per cent, $23, f. o. b. Jisco and Ashland furnaces. The freight rate to Pittsburg is $1.90. The foreign grades are held at $1 or more a ton over domestic prices.

Plates.—The recent reduction in the price of steel has seriously checked the plate market and no awards of any importance were placed in this market during the past week. All mills appear to be maintaining the price of 1.35c, Pittsburg, as no sales have been reported below this figure. Some of the railroads are figuring on new cars, but with the exception of 41 steel passenger coaches to be built by the Pressed Steel Car Co. for the Pennsylvania Railroad Co., no awards have been made. The Queen & Crescent Railroad Co. is figuring on a total of about 1,200 freight cars. Bids will be opened June 9 on the 4,500 tons of plates to be used in the Los Angeles, Cal., aqueduct, and it is likely that definite action will be taken in the near future regarding the proposed new gas holder for the Allegheny County Gas Co., which will require from 3,000 to 4,000 tons of plates. We quote the market as follows:

Tank plates, ¼ inch thick, 6¼ to 100 inches, 1.35c. Extras are as follows, per 100 pounds: Boiler and flange steel plates, 0.10c; A. B. M. and ordinary firebox steel plates, 0.20c; still bottom steel, 0.20c; marine steel, 0.40c; locomotive firebox steel, 0.50c; all sketches excepting straight taper plates varying not more than 4 inches in width at ends, narrowest end being not less than 30 inches, 0.10c; circles, 0.20c. Plates in widths over 100 inches up to 110 inches, 0.05c; over 110 inches up to 115 inches, 0.10c; over 115 inches up to 120 inches, 0.15c; over 120 inches up to 125 inches, 0.25c; over 125 inches up to 130 inches, 0.50c; over 130 inches, 1c. Gages under ¼ inch to and including 3-16 inch plate on thin edge, 0.10c;

under 3-16 and including No. 9, 0.25c. Five cents extra for less than carloads. Terms net cash in 30 days.

Sheets.—During the past few days, there has been a noticeable increase in bookings of sheets at the lower prices announced last week, although the bulk of trading is for immediate shipment, as consumers are not showing much interest in their forward requirements. Buying is about equally divided between jobbers and the consuming trade. Investigation shows that stocks in the hands of jobbers are extremely light. Present prices are quoted to jobbers only for delivery up to Oct. 1. There is a fair amount of business in roofing sheets under active negotiation. The new sheet mills of the American Sheet & Tin Plate Co. at Gary, Ind., were given a test run last week, but it has not been decided when these mills will be placed in operation. We quote prices as follows, with $1 a ton added as the delivered price in the Pittsburg district, showing differentials between gages as announced in conection with the recent reduction in prices:

Black sheets—No. 30 gage, 2.15c; No. 29 gage, 2.05c; No. 28 gage, 2c; No. 27 gage, 1.95c; Nos. 26 and 26 gage, 1.90c; Nos. 22 to 24 gage, 1.85c; Nos. 17 to 21 gage, 1.80c; Nos. 15 and 16 gage, 1.75c; Nos. 13 and 14 gage, 1.70c; Nos. 10 to 12 gage, 1.65c. Galvanized sheets—No. 30 gage, 3.30c; No. 29 gage, 3.10c; No. 28 gage, 3c; No. 27 gage, 2.85c; Nos. 25 and 26 gage, 2.70c; Nos. 23 and 24 gage, 2.50c; Nos. 18 to 22 gage, 2.40c; Nos. 15 to 17 gage, 2.25c; Nos. 12 to 14 gage, 2.10c; Nos. 10 and 11 gage, 2c. Blue annealed sheets—No. 8 gage, 1.40c; Nos. 9 and 10 gage, 1.50c; Nos. 11 and 12 gage, 1.55c; Nos. 13 and 14, 1.60c; Nos. 15 and 16, 1.70c. Painted roofing sheet—No. 28 gage, 1.40c; No. 27 gage, 1.55c; No. 26 gage, 1.65c; No. 25 gage, 1.85c; No. 24 gage, 2.10c; No. 23 gage, 2.40c; No. 22 gage, 2.60c; No. 21 gage, 2.80c; No. 20 gage, 3.05c; No. 18 gage, 4.05c; No. 16 gage, 4.90c. Galvanized roofing sheets—No. 29 gage, 2.40c; No. 28 gage, 2.55c; No. 27 gage, 2.60c; No. 26 gage, 2.65c; No. 25 gage, 3.05c; No. 24 gage, 3.15c; No. 23 gage, 3.50c; No. 22 gage, 3.70c; No. 21 gage, 4.05c; No. 20 gage, 4.35c; No. 18 gage, 5.70c; No. 16 gage, 6.50c, all f. o. b., Pittsburg.

Tin Plate.—Practically all large consumers of tin plate are covered by contract over the next three months and little new business is appearing, as buyers who have not covered for fourth quarter requirements are not disposed to cover for this period. Specifications have been moderately heavy and indications are that shipments to Aug. 1 will be fairly heavy. It is estimated that the tin plate industry is running between 75 and 80 per cent of capacity. Prices are fairly firm. We quote the market as follows:

Coke tin plate, 10-pound basis, 14 x 20, $3.70 f. o. b. mill, Pittsburg district.

Rails and Track Material.—Some fairly heavy specifications against contracts for standard steel rails have been received by local mills during the week. The action of the Baltimore & Ohio Railroad Co. in making awards for approximately 23,000 tons of rails, of which about 5,000 tons will be rolled by the Carnegie Steel Co. and 7,500 tons by the Cambria Steel Co., confirms statements made last month that some of the larger trunk lines would place additional orders for rails in June. It is stated that some of the other railroads which closed for fairly heavy tonnage earlier in the year will re-enter the market shortly. Bookings of light rails since May 31 have been comparatively light, although a few orders have been placed at full prices. New business and specifications against contracts for railroad spikes show no improvement over a week ago and the $1.60, Pittsburg, quotation is being shaded by some mills. We quote the market as follows, the base price on open-hearth rails being 1.34c per pound at the mill:

Fifty-pound and heavier, 1.25c per pound; carloads and less than 500 tons, 1.34c per pound; light rails on base weight of 40 to 45 pounds, 1.16c, the schedule on the other weights being irregular and subject to negotiations; angle splice bars for standard sections, 1.50c, Pittsburg; track bolts, 2.25c, Pittsburg.

RAILROAD SPIKES.

4½, 5 and 5½ x ⅝	$1.55 to 1.60
3, 3½, 4, 4½ and 5 x ½	.10
3½, 4 and 4½ x 7/16	.20
3, 3½, 4 and 4½ x ⅜	.30
2½ x ⅜	.40
2½, 3 and 3½ x 7/16	.60
2 x 7/16	.80

Steel.—The lower prices on semi-finished steel which became effective June 1 have not brought out much additional business, as most of the large users are covered by contract. During the past few days, there has been a slight gain in specifications, although the total tonnage entered on mill books since June 1 has been comparatively light. All mills are understood to be maintaining prices announced last week. While no official announcement was made concerning prices on forging billets, local mills have reduced quotations $2 a ton to $26, Pittsburg. The new open-hearth furnaces of the Jones & Laughlin Steel Co., at Aliquippa, Pa., and the Republic Iron & Steel Co. in the Youngstown, O., district have been completed, but it has not been decided when the new plants will be placed in operation. We quote the market as follows:

Bessemer 4 x 4 billets with 0.25 carbon and less are quoted at $21, with the usual extras for size and analysis, and open-hearth rolling billets, $21. Bessemer sheet and tin bars are quoted at $22, and open-hearth sheet bars are quoted at $22, f. o. b. Pittsburg or Youngstown, with full freight to destination added. Forging billets are quoted at $26, Pittsburg.

Hoops and Bands.—The new low quotation of 1.25c, Pittsburg, on hoops and bands has not brought out much new business. Sellers continue to ask 1.45c, Pittsburg, on hoops and trading is extremely light. We quote the market as follows:

Hoops in carload lots, 1.45c, Pittsburg; in less than carload lots, 1.55c; bands, 1.25c base, with net extras, as per standard steel.

Merchant Bars.—There has been some buying of steel bars at 1.25c, Pittsburg, and, while some of the agricultural interests are negotiating for fairly heavy tonnage, the larger buyers are not showing a great deal of interest. Three local steel companies report that they have taken several contracts for steel bars for delivery over the next 12 months at 1.25c, Pittsburg. In addition scattered sales have been made for early shipment, but the tonnage involved is comparatively light. Reports are heard of 1.25c, Pittsburg, having been shaded on particularly desirable business for immediate shipment and in some quarters the statement is made that these sales probably were made between May 24, when the Republic Iron & Steel Co. cut prices $3 a ton, and June 1, when the new price card of other manufacturers went into effect. Demand for bar iron is extremely light and little business is appearing. A new price card on shafting has been put into effect and the new discounts are 60 per cent off in carload lots, and 55 per cent in less than carload lots, delivered in base territory. We quote the market as follows:

Common iron bars, 1.30c, Pittsburg; Bessemer and open-hearth steel bars, 1.25c; plow and cultivator, 1.25c; channels, angles, zees, tees, under 3-inch, 1.35c, all f. o. b. mill. The following differentials are maintained on steel: Less than 2,000 pounds of a size, 0.35c advance. Cold rolled and ground shafting, 60 per cent off in carloads and 55 per cent in less than carloads, delivered in base territory.

Muck Bar.—No important sales of muck bar have been made for over three months and a definite price has not been established. Makers of the best grades of muck bar continue to quote from $28.50 to $29, Pittsburg, and we quote the market nominally at this figure.

Structural.—Orders for structural work placed with local mills during the past week involve only small lots of from 100 to 200 tons, and only a very small percentage of this work

is in the Pittsburg district. There is a large amount of work involving between 20,000 and 30,000 tons of structural steel under active negotiation in the immediate Pittsburg district, but it has not been decided when bids will be asked on any of this, although it is understood that the Pittsburg Crucible Steel Co., which will require about 6,000 tons of structural steel at Midland, Pa., will ask for bids probably this month. The market appears to be fairly firm at 1.35c, Pittsburg. We quote the market as follows:

Beams and channels, 15 inches and under, 1.35c; over 15 inches, 1.45c; zees, 1.35c; tees, 1.40c; angles, from 3 to 6 inches, 1.35c; over 6 inches, 1.45c; universal and sheared plates, 6¼ inches wide and wider, 1.35c.

Merchant Pipe.—The market on pipe has quieted down and comparatively little tonnage has been booked during the week. Heavy tonnage is involved in proposed new lines to be laid this year, but the recent cut in prices of steel and the unsettled condition of the market generally have resulted in orders being held up. Inquiries pending include 80 miles of 6-inch steel pipe for delivery in Alabama and 30 miles of 12-inch steel pipe for West Virginia shipment. Prices on oil country goods have been reduced from $2 to $3 a ton, but no changes have been made in prices on merchant iron and steel pipe. The new card on oil country goods simply brings the prices on this material down to the basis established last fall when prices on merchant iron and steel pipe were reduced. We quote the following official discounts in carload lots, subject to the usual preferential discount to the larger buyers, merchant pipe, where specified, being offered in from ⅛ to 6 inches:

Iron and Steel Pipe Basing Prices.

	Steel.		Iron.	
		Butt weld.		
	Black.	Galv.	Black.	Galv.
⅛, ¼, ⅜ inch.....	72	58	68	54
½ inch	75	63	71	59
¾ to 1¼ inch.....	79	69	75	65
2 to 3 inches	80	70	76	66
		Lap weld.		
2 inches	76	66	72	62
2½ to 4 inches	78	68	74	64
4½ to 6 inches.....	77	67	73	63
7 to 12 inches.....	75	59	71	55
EXTRA STRONG, PLAIN ENDS.				
		Butt weld.		
⅛, ¼, ⅜ inch	69	59	65	55
½ inch	74	68	70	64
¾ to 1¼ inch	78	72	74	68
2 to 3 inches.....	79	73	75	69
EXTRA STRONG, PLAIN ENDS.				
		Lap weld.		
2 inches	75	69	71	65
2½ to 4 inches.....	77	71	73	67
4½ to 6 inches.....	76	70	72	66
7 to 8 inches.....	69	59	65	55
9 to 12 inches.....	64	54	60	50
DOUBLE EXTRA STRONG, PLAIN ENDS.				
		Butt weld.		
½ inch	64	58	60	54
¾ to 1¼ inch.....	67	61	63	57
2 to 3 inches	69	63	65	59
DOUBLE EXTRA STRONG, PLAIN ENDS.				
		Lap weld.		
2 inches	65	59	61	55
2½ to 4 inches.....	67	61	63	57
4½ to 6 inches.....	66	60	62	56
7 to 8 inches	59	49	55	45

Plugged and reamed pipe is furnished at 2 points higher price, either butt or lap weld.

Boiler Tubes.—This market is extremely quiet, and, while some buyers are negotiating for last half requirements, little tonnage has been booked for this period. The market on iron boiler tubes is irregular. We quote the following discounts on steel boiler tubes in carload lots to jobbers:

1¼ to 2¼ inch	65
2½ inch	67½
2¾ to 3¼ inch	70
3½ to 4½ inch	72½
5 and 6 inch	65
7 to 13 inch	62½

To destination east of the Mississippi river will be sold at delivered discount for carloads lowered by 2 points, for lengths 22 feet and under; longer lengths, f. o. b. Pittsburg. Usual extras to jobbers and boiler manufacturers.

Wire Products. — Specifications against contracts for wire and nails were extremely heavy during the last 10 days of May, as a result of notices sent out a few weeks ago, advising jobbers and other buyers that all contracts made some months ago at low prices would be terminated June 1. Since June 1 very little new business has appeared and specifications have not been very heavy. Manufacturers state that since June 1 all shipments of wire nails have been made on a basis of $1.80, Pittsburg. Practically all buyers of wire products are covered by contract. Demand for cut nails is only moderately heavy and the market is quotable at $1.60, Pittsburg. We quote the market as follows:

Wire nails, jobbers' carload lots, $1.80; retailers' carload lots, $1.85; cut nails (western makers), jobbers' carload lots, $1.60; cut nails (eastern makers), Pittsburg base, $1.70; painted barb wire, jobbers' carload lots, $1.80; retailers' carload lots, $1.90, with 30c for galvanizing; plain wire to jobbers in carloads, $1.60, and to dealers, in carloads, $1.65; polished staples, $1.80; galvanized staples, $2.10.

Wire Rods.—Specifications against contracts for wire rods are only fair and new business is light. Reports are heard of low prices, but the larger mills continue to ask from $28.50 to $29, Pittsburg, and we quote the market at these figures.

Coke.—While the coke market is extremely quiet, most sellers look for increased activity in the very near future, as there has been very little buying for second half delivery. While a definite market price for last half furnace coke has not been established, it is not likely that extremely low prices will be quoted for this period. In one or two instances, furnaces which have been buying from month to month, have covered for June requirements on a basis of from $1.40 to $1.50, ovens. One of these sales includes 9,000 tons for shipment to New York state. The sale of the coking coal holdings of the Pittsburg Coal Co., including approximately 1,000 ovens operated by the Colonial Coke Co. with a monthly production of about 55,000 tons, to the United States Steel Corporation, is expected to have a good effect upon the coke market, as the output of this company will be withdrawn from the open market. Production is being curtailed to meet dwindling demands. At the present rate of production, the total output for the Connellsville region for the second quarter will be about 3,500,000, as against 4,200,000 for the first quarter. We quote standard Connellsville furnace coke for prompt shipment at from $1.40 to $1.50, ovens, and for second half at from $1.60 to $1.80, ovens. On high grade Connellsville foundry coke, we quote from $1.75 to $2, ovens, for prompt shipment, and from $2.15 to $2.40, ovens, for delivery over the remainder of the year. The Connellsville *Courier's* figures for the week ending May 27 show, 24,214 active ovens with an output of 270,749 tons, as compared with 24,322 active ovens and a production of 273,108 tons the previous week.

Old Material.—The scrap market, which made a fairly good showing during the early part of May, has quieted down and some signs of weakness have appeared since the reduction in prices on some lines of steel. With the exception of re-rolling rails, which are now quotable at from $13.50 to $14, a reduction of 50 cents a ton, the market is not quotably lower. The Pennsylvania Railroad Co. has asked for bids on upward of 20,000 tons of scrap, on which bids will close June 14, and other initial lines have asked for bids on heavy tonnages. The lists put out by the railroads this month are exceedingly heavy on account of the fact that only a small portion of the May offerings was disposed of, owing to the low prices offered by the dealers. Only in a few instances have consumers requested a suspension of shipments. We quote, gross tons, delivered in the Pittsburg district, including Monessen, Sharon, Steubenville, Brackenridge and Follansbee as follows:

Heavy melting scrap	$13.00 to 13.25
Rerolling rails	13.50 to 14.00
Bundled sheet scrap	10.50 to 10.75
Iron axles	23.50 to 24.00
Old iron rails	15.50 to 16.00
No. 1 wrought scrap.....	13.50 to 14.00
Old car wheels	13.00 to 13.50
Low phosphorus	16.50 to 17.00
Machine shop turnings	9.00 to 9.25
Cast borings	8.75 to 9.00
No. 1 cast scrap	13.00 to 13.50
Malleable	13.00 to 13.50

Northwestern Iron Co., Mayville, Wis., took the blast off its A stack on May 9 and off its B stack on May 27.

CHICAGO

Demand for Steel From Store Improves—More Inquiry for Pig Iron.

Office of THE IRON TRADE REVIEW,
1328 Monadnock Block, June 6.

The brightest spot in the Chicago market this week is the demand for steel from store. Orders have been received for carload lots for immediate shipment out of stock, and there is a very satisfactory run of small orders for all lines of finished material. It is not clear yet whether this is an accumulation of business which was held back by the price readjustment, or whether it may be the first indication of a revival in consumptive demand for steel. Old observers in the Chicago trade expect the tide to turn first in the demand from small consumers. People have now forgotten about supreme court decisions and other political events which were looked upon for a year as a menace to business. The bugaboos are all buried, and there is nothing left to frighten the timid business man. Crop prospects are the brightest ever known at this season. Harvest has begun in the winter wheat belt in the southwest, and the crop may break all records. It is bringing out this week a 50,000-ton rail order from the Missouri Pacific. In the northwest crop prospects have made Hill an optimist and his stocks are booming. The corn belt also has enjoyed ideal crop conditions. If this continues, the western railroads will soon be an active factor in the market.

Pig Iron.—The dull period in the market has lasted so long that Chicago iron men are becoming more confident of a turn in the near future. The only change this week from the record breaking stagnation in May is that there are more inquiries from small foundries. These have not yet resulted in actual sales, excepting one or two lots, but inquiries from the small foundry are looked upon as significant. While the average foundry is carrying a good stock of iron, a little genuine improvement in business will stimulate buying. The big malleable and steel foundries depend chiefly on railroad contracts, and will run at only a small percentage of their capacity until the railroads begin ordering equipment and repair shop material for the fall crop movement. The small foundries should logically be the first to feel the revival of consumptive demand that is generally expected, now that political worries have lost their potency in the business world. The recent period of stagnation has been disastrous to southern iron. The leading brands are now selling in this territory at $10.50 Birmingham, for third quarter.

(Shipment this year.)

Lake Superior charcoal	$17.00
Northern foundry No. 2	15.00
Southern foundry No. 2	14.85
Southern silveries, 5 per cent silicon	16.35
Jackson Co. silveries, 8 per cent	18.40
Malleable Bessemer	15.00
Alabama basic	15.10

Billets.—The regular price quoted by the leading mills is now $23.60, Chicago, for rolling billets and $28.60 for open-hearth forging billets, these prices including $2.60 freight from Youngstown, O. Smaller independent mills are shading these quotations, but current business is very light on account of the lack of railroad orders in the forge shops.

Merchant Bars.—A few of the smaller implement manufacturers have placed contracts for soft steel bars, but the aggregate of their business is only a few thousand tons. The large plow companies have not come into the market and are standing pat in their policy of indifference. They explain that if they contract now it will establish a price for the coming year and they can afford to wait some time yet before placing their business. Current orders and specifications are light all along the line in soft steel bars, bar iron and hard steel.

We quote, Chicago delivery, as follows:

Bar iron, 1.20c to 1.25c; hard steel bars, rerolled, 1.25c to 1.30c; soft steel bars and bands and small shapes, 1.43c to 1.48c, base; hoops, 1.63c to 1.68c; planished or smooth finished tire steel, 1.63c to 1.68c, base; iron finished tire steel, 1.58c, base; smooth finished machinery steel, 1 inch and larger, 1.83c. Shafting 60 per cent off list for carload lots, 55 per cent off for less.

On iron and steel from local stock, we quote as follows:

Bar iron, 1.80c to 1.90c per pound base; soft steel bars, 1.65c to 1.75c per pound base; soft steel hoops, 2.10c to 2.20c, full extras.

Structural Material.—The reduction last week in the base price of structural material seems to have had no effect on the market, as it had been discounted by the fabricating shops. One more large job was let in Chicago last week, the Otis Bank building, 5,932 tons, to the American Bridge Co. Other contracts were: Tribune building, Terre Haute, Ind., 380 tons, to the Decatur Bridge Co., and spouts for Ore Dock No. 1, Duluth & Iron Range Railroad Co., Two Harbors, Minn., 665 tons, to the American Bridge Co.

We quote, structural material, f. o. b. Chicago, as follows:

Beams and channels, 15 inches and under, 1.53c. For extras, see Pittsburg report.

Plain material out of store is as follows:

All angles, 3 inches and larger, including 6 inches, $1.75 to $1.85 per 100 pounds; angles over 6 inches, $1.85 to $1.90 per 100 pounds, base; beams, 3 to 15 inches, inclusive, $1.75 per 100 pounds, base; channels, 3 inches and larger, $1.75 per 100 pounds, base.

Rails and Track Supplies.—The railroads continue the policy of placing relatively small orders for rails. The Illinois Steel Co. booked 10,000 tons of this business last week for standard sections. The Missouri Pacific has been in the market for a round lot estimated at 52,000 tons, including requirements of the Denver & Rio Grande and other connections. This inquiry has not been reported closed. Current business in track supplies is of moderate volume, as railroad storekeepers are keeping their stocks down until after the close of the fiscal year, June 30.

We quote light rails, f. o. b. Chicago, and track supplies, f. o. b. Joliet, as follows:

Light rails, carloads, 40 to 45-pound, 1.16c to 1.20½c; 30 to 35-pound, 1.19½c to 1.24c; 16, 20 and 25-pound, 1.20½c to 1.25c; 12-pound, 1.25c to 1.29½c.

Light section relayers, 45 pounds and under, subject to inspection, $21 to $23; standard section relaying rails, subject to inspection, $23.50 to $24.

Track supplies, f. o. b. Joliet, angle bars, 1.50c to 1.60c; railroad spikes, 1.65c to 1.75c; smaller size spikes, 1.70c, base; track bolts with square nuts, 2.15c to 2.25c, base.

Plates. — The mills have a fair amount of current business, but need the tonnage that grows out of large car orders to make good rolling schedules. Inquiries for cars are light, but if crop prospects continue, it may be necessary for the railroads to buy more equipment for the fall movement.

We quote, mill prices, f. o. b. Chicago, as follows:

Tank plates, ¼ inch thick, 6¼ to 100 inches wide, 1.53c. For extras, see Pittsburg report.

Store prices are as follows:

Tank steel, ¼ inch and heavier, up to 72 inches wide, 1.75c to 1.85c.

Sheets.—The readjustment of prices is having a better effect in the sheet trade than in other lines. Inquiries from buyers amounting to a considerable tonnage for third quarter are under negotiation.

We quote, store prices, f. o. b. Chicago, as follows:

Blue annealed, No. 10, 2c; No. 12, 2.05c. Box annealed, No. 28, 2.65c. Galvanized, No. 28, 3.55c.

For mill prices, see Pittsburg report. Freight to Chicago, 18 cents.

Wire Products.—The wire mills have made a very good showing for the first half of the year. The agricultural demand apparently has not been affected by the decline in prices of live stock and grain and the tonnage will be equal to former years.

We quote, f. o. b. Chicago, as follows:

Wire nails, jobbers' carload lots, $1.98; retailers' carload lots, $2.03; retailers' less than carload lots, $2.13; painted barb wire, jobbers' carload lots, $1.98; retailers' carload lots, $2.03; retailers', less than carload lots, $2.13; with 30c for galvanizing; plain wire to jobbers, $1.78; plain wire, retailers' carload lots, $1.83; staples, bright, $1.98.

Merchant Pipe and Tubes.—There is a fair tonnage moving from the mills, but new buying is not so active, as the dull mid-summer period is approaching.

We quote, iron and steel pipe and tubes, out of store, as follows:

Iron and Steel Pipe Basing Prices.

	Steel. Black.	Steel. Galv.	Iron. Black.	Iron. Galv.
⅛-¼ inch	69.2	54.2	63.2	48.2
⅜ inch	72.2	59.2	66.2	53.2
2 in. to 3 in.	77.2	66.2	72.2	61.2
4½-6 inches	74.2	63.2	69.2	58.2
7-12 inches	71.2	54.2	67.2	50.2
Extra Strong Plain Ends.				
⅜ inch	70.2	63.2	54.2	52.2
2-3 inches	75.2	68.2	61.2	55.2
7-8 inches	65.2	....	59.2	47.2
Double Extra Strong.				
½ inch	58.2	50.2	....	....
2-3 inches	63.2	55.2	....	....
7-8 inches	53.2	41.2	....	....

Tubes.

	Lap weld steel. Per cent.	Charcoal iron. Per cent.	Shelby seamless. Per cent.
1 inch	39	..	57½
1¼ to 2¼ inch	55	40	35
2¼ to 3¼ inch	62½	50	46

Cast Iron Pipe.—The pipe foundries have had a very good year. The tonnage they have taken has been considerably in excess of last year. There were no important lettings last week and routine business dropped off somewhat, as municipal councils and governing bodies are now adjourning for the summer vacation.

We quote the market, f. o. b. Chicago, as follows:

Four-inch water pipe, $25; 6 to 12 inches, $24.50, larger sizes, $24; gas pipe, $1 a ton higher.

Old Material.—The market remains practically unchanged from last week and has not been affected one way or the other by the readjustment of steel prices. Dealers are trading cautiously and will not go short by selling to consumers for forward shipment. Neither are they very active in bidding for railroad scrap, although some of the railroads on lists which closed last week received slightly better bids than current quotations. The demand from both gray iron and malleable foundries is light and the large mills are generally carrying full stocks.

We quote the market, for delivery in consumers' yards, f. o. b. Chicago, as follows:

GROSS TONS.

Old car wheels	$12.75 to 13.25
Old iron rails	14.50 to 15.00
Rerolling rails (5 ft. and over)	12.25 to 12.75
Old steel rails (3 ft. and under)	11.25 to 11.75
Frogs, switches and guards	10.25 to 10.75
Heavy melting steel	10.25 to 10.75
Shoveling steel	10.00 to 10.50

NET TONS.

No. 1 R. R. wrought	$11 00 to 11.50
No. 2 R. R. wrought	10.00 to 10.50
Arch bars and transoms	13.50 to 14.00
Knuckles, couplers and springs	10.00 to 10.50
Shafting	15.00 to 15.50
Iron car axles	18.00 to 18.50
Steel car axles	16.50 to 17.00
Locomotive tires	16.00 to 17.00
Dealers' forge	10.00 to 11.00
Pipes and flues	8.00 to 8.50
No. 1 cast	10.75 to 11.25
No. 1 busheling	8.75 to 9.25
No 2 busheling	6.75 to 7.25
No. 1 boiler cut	7.50 to 8.00
Boiler punchings	12.50 to 13.00
Cast and mixed borings	5.25 to 5.75
Machine shop turnings	6 25 to 6.75
Railroad malleable	10.25 to 10.75
Agricultural malleable	9.25 to 9.75
Stove plate and light cast scrap	9.25 to 9.75
Angle bars, splices, etc, iron	12.50 to 13.00
Angle bars, steel	10.25 to 10.75

CLEVELAND

Y. M. C. A. Building Awarded—Sheet Schedule Causes Complaint.

Office of THE IRON TRADE REVIEW,
Penton Building, June 6.

Iron Ore.—The market continues to drag, and furnace companies are showing no disposition to make contracts. Some interests having large supplies of ore on hand are showing a disposition to press it upon the market, and are willing to make concessions, if necessary, to effect sales. Whether this stock pile ore will become a factor of importance will depend upon market conditions later in the season.

On base ores with the guarantee of 55 per cent on old range and Mesabi Bessemer, and 51½ per cent on old range and Mesabi non-Bessemer, we quote as follows: Old range Bessemer, $4.50; Mesabi Bessemer, $4.25; old range non-Bessemer, $3.70; Mesabi non-Bessemer, $3.50.

Pig Iron.—Sales have been confined to small lots, the largest being for 500 tons. Many foundries are pursuing a hand to mouth policy, and are buying for prompt shipment only. In spite of the continued dullness, prices are firmly adhered to.

No. 1 foundry	$14.50
No. 2 foundry	14.25
No. 2 southern	14.85
Gray forge	13.25
Bessemer	15.90
Lake Superior charcoal	17.50
Jackson Co. 8 per cent silvery	18.50

Coke.—Sales are confined to car load lots, and most of them are made at minimum prices. We quote:

Connellsville furnace coke, $1.40 to $1.50 for prompt delivery, and $1.60 to $1.80 for second half. Connellsville foundry coke, $1.75 to $2 for prompt, and $2 to $2.40 for second half.

Finished Materials.—The contract for the Y. M. C. A. building, about 1,500 tons, has been awarded to T. H. Brooks & Co. at $65,750. Numerous building projects and also several thousand tons of bridge material for which the Lake Shore railroad has been negotiating, are still pending, and there is a general disposition not to contract, owing to the reduction in prices of $1 per ton, which buyers refuse to believe is the lowest reduction to be made. The Wheeling & Lake Erie R. R. is in the market for four bridges, requiring 900 tons of steel. T. H. Brooks & Co. have taken a contract for the K-W Ignition Co.'s new building, which will require from 300 to 400 tons. The Lackawanna Bridge Co. took 575 tons for the Taylor & Boggis foundry for this city.

The recent action in making a heavy cut in prices of sheets has caused considerable dissatisfaction. Some of the independent sheet manufacturers, who say they were not consulted, regard the action as too drastic. Plate manufacturers complain of prices of some gages of sheets being reduced to such an extent that they compete severely with plates of similar size. Jobbers have reduced quotations in harmony with the reduction on mill prices of finished materials, except on shapes, on which prices remain unchanged.

Old Material.—Almost insignificant quantities of material are passing and demand has almost entirely faded away. Neither heavy steel nor rolling material is being sought and the general tendency of prices is toward weakness. Stove plate quotations have been reduced but other prices are nominal. We quote, gross tons, f. o. b. Cleveland, as follows:

Old iron rails	$15.00 to 15.50
Old steel rails (under 6 ft.)	13.50 to 14.00
Old steel rails (over 6 ft.)	12.00 to 12.50
Relaying rails	20.50 to 21.00
Old car wheels	12.50 to 13.00
Old steel boiler plate	10.00 to 10.50
Malleable iron (railroad)	12.25 to 12.75
Steel axles	19.00 to 19.50
Axle turnings	8.00 to 8.50
Malleable iron (agricultural)	11.00 to 11 50
Heavy steel	11.50 to 12.00
Country mixed steel	9.50 to 10.00

We quote, net tons, as follows:

No. 1 R. R. wrought	$12.50 to 13.00
No. 1 busheling	11.00 to 11.50
No. 1 machine cast	11.50 to 12.00
No. 1 dealers' wrought	11.00 to 11.50
Machine shop turnings	6.50 to 7.00
Pipes and flues	8.00 to 8.50
Wrought drillings	6.50 to 7.00
Stove plate	9.00 to 9.50

M. E. Herbert Heater Co., Chicago, has changed its name to the Herbert Boiler Co., and has increased its capital stock from $50,000 to $100,000.

Southern Furnaces Blow Out—Melters Not Anxious to Buy.

Office of THE IRON TRADE REVIEW,
808 Provident Bank Bldg., June 6.

Pig Iron.—The only change apparent in the pig iron situation is the continued blowing out of southern furnaces, which are realizing the futility of continuing in blast as long as the production exceeds the consumption. For the remainder of the year southern iron is being generally quoted on a basis of $10.50, Birmingham, for No. 2. Some sales are being made at 25 cents below this figure. A Detroit melter is in the market for 500 tons of a special low phosphorus iron for July and August shipment. A southern Indiana melter is out for about 900 tons of southern iron and from 100 to 200 tons of special low phosphorus iron for the last half of the year. A central Ohio melter wants 300 tons of foundry iron, probably of a northern brand. Locally a few scattered inquiries are out for very small tonnages. A central Ohio melter took 1,000 tons of standard foundry iron and several hundred tons of a special iron for the last of the year delivery. Shipments on specifications continue to move fairly well, though some of the smaller melters are holding up shipments as they are unable to use their monthly allotments.

Without a doubt a great many melters are not covered for their requirements for any length of time, and are merely continuing their policy of some months past in buying only what they need from day to day. The break in the market that has been expected by the various interests for so long has, as yet, not materialized, and at present there seems to be no telling when it will come. A sale is noted of 1,000 tons of foundry iron to a central Ohio melter, two-thirds of northern and one-third of southern iron. There has hardly been enough activity in northern iron to test the market, but quotations are nominally based on a basis of $13.50 to $13.75, Ironton, for northern No. 2. Based on a freight rate of $3.25 from Birmingham, and $1.20 from Ironton, we quote, Cincinnati and southern Ohio, for the remainder of the year, as follows:

Southern foundry No. 2	$ 13.75
Southern foundry No. 3	13.25
Southern foundry No. 4	13.00
Southern gray forge	12.75
Mottled	12.50 to 12.75
Southern No. 1 soft	14.25
Southern No. 2 soft	13.75
Standard southern car wheel	25.50 to 25.75
Northern No. 2 foundry	14.70
Northern No. 3 foundry	14.20
Northern No. 4 foundry	13.70
Jackson county 8 per cent silicon	17.20 to 17.70

Coke.—In renewing coke contracts, great difficulty is found with some melters who find themselves short on contracts for castings, but on the whole coke contracts are being satisfactorily disposed of. Prices for contract coke for the next 12 months have weakened a little in Wise county brands, the best of which are now obtainable at from $2 to $2.25, as practically no premium is being asked for contract over spot sales. Connellsville foundry coke is available for contract at from $2 to $2.40, the maximum figure of which is an advance of 15 cents over the spot shipment price. A number of sample cars of coke are being sold on trial shipments down as low as $1.80 and $1.85. Ovens in all the districts are being banked to reduce the output in accordance with the blast furnace reductions now taking place. We quote the various producing districts as follows:

	Prompt shipment.	Contract second half.
Connellsville district:		
Foundry coke	$2.00 to 2.25	$2.00 to 2.40
Furnace coke	1.35 to 1.60	1.75 to 1.85
Wise county district:		
Foundry coke	2.00 to 2.25	2.00 to 2.25
Furnace coke	1.75 to 2.00	*Sliding [scale basis.
Pocahontas district:		
Foundry coke	2.00 to 2.15	2.10 to 2.35
Furnace coke	1.60 to 1.75	1.75 to 1.85
New river:		
Foundry coke	2.50 to 3.25	2.60 to 3.25
Furnace coke	2.10 to 2.15	2.10 to 2.20

*Sliding scale basis means $1.60 for coke based on $9, Birmingham, for pig iron, with an advance of 16 2-3 per cent of the amount over $9 at which pig iron is quoted. This is the usual basis. Other forms of sliding contracts are also made.

Finished Material.—The reduction in steel bars has brought out a number of orders that have been waiting for the cut to be made, but outside of this there has been no apparent increase in inquiry, specifications or sales. Some interest locally centers around the introduction of special steels for use by machine tool builders in making lathe, shaper and planer spindles. Local warehouses have a fair stock on hand and while selling is fair on a basis of 1.25c, Pittsburg, there is no continuity in sales to any one source.

Old Material.—On many items of old material the quotations are merely nominal as the movement is not sufficient to bring out real figures at which material would sell if there were a demand. No. 1 busheling is fairly strong at $9.25 to $9.75. Stove plate shows a reduction of 50 cents to $7.75 and $8.25. The rolling mills taking scrap are getting the pick of the market at practically their own figures. The railroads have not brought out any additional lots and are holding for better market. We quote the old material market for delivery in consumers' yards, Cincinnati and southern Ohio, as follows:

GROSS TONS.

Old iron rails, gross	$14.00 to 14.50
Old steel, rerolling, gross	13.00 to 14.00
Old iron axles, gross	19.25 to 19.75
Steel melting scrap, gross	11.00 to 11.75
Car wheels, gross	11.50 to 12.50

NET TONS.

Old No. 1 R. R. wrought	$12.25 to 12.75
No. 1 machinery	10.50 to 11.00
No. 1 busheling	9.25 to 9.75
Stove plate	7.75 to 8.25
Machine shop turnings	6.50 to 7.00
Cast borings	5.50 to 6.25
Grate bars	7.75 to 8.50
Sheet scrap, bundled	7.50 to 8.50
No. 1 cast scrap	10.50 to 11.00
Heavy turnings	7.75 to 8.75

Cuts in Prices Check Buying—Pig Iron Market is Affected.

Office of THE IRON TRADE REVIEW,
1115 West Street Bldg., June 6.

Iron Ore.—A Schuylkill valley furnace has closed for about 10,000 tons additional of Spanish low phosphorus ore, but the price is not stated. The regular buying of local New Jersey and New York state ores by eastern furnaces continues from month to month, these sales aggregating probably 50,000 tons monthly. The prices ruling on such grades are from 7½ to 8 cents per unit, delivered.

Pig Iron.—The reviving interest of eastern buyers recently in evidence, has been further suspended by the price uncertainties of the general market according to the developments of the past week. The larger negotiations, in which a very fair tonnage was involved, have been checked in the expectation that more favorable propositions may follow the recent reductions in finished lines. Current sales are largely of the small and routine order and consumers are less inclined to accede to the solicitation of the buyers for offers to be put up to the furnaces. Voluntary inquiry is small. Some recent large cast iron pipe awards placed or pending in New York and other eastern cities, have caused pipe makers to put out some new inquiries for low grade iron. One eastern Pennsylvania shop is in the market for 4,000 tons of No. 3 and forge for July and August shipment, while the leading pipe interest is asking protection on 6,000 tons for June, July and August delivery at Buffalo. A Troy, N Y., stove works has taken 1,500 tons of foundry grades for forward shipment and a sale of 2,000 tons of charcoal to a buyer in this district is noted. The large blocks of malleable put out for prices by Connecticut consumers are still held up and all the iron that

has been purchased by these interests has been some small lots of high silicon metal from Buffalo. A small additional tonnage of Virginia iron was placed in metropolitan and New England territory the past week at the prices of $12.25 to $12.50, furnace, for No. 2X for third and fourth quarter. Some of the Buffalo makers continue to accept business at $13.25, furnace, for No. 2X and this seems to be the minimum in that territory. Eastern Pennsylvania makers are not quoting below $14.50, furnace, or $15.20, in tidewater territory, for No. 2X. Southern iron was offered in the east this week at $10.25, Birmingham, for No. 2 for last half shipment. Some basic consumers in the east have this week offered better than $14.50, delivered, on forward shipment, which would indicate that the $14.50, delivered, price recently made, is of limited extent. We quote for prompt and third quarter iron delivered at tidewater, as follows:

Northern foundry No. 1	$14.85 to 15.50
No. 2X foundry	14.60 to 15.20
No. 2 plain	14.35 to 14.75
No. 2 Virginia	15.05 to 15.30
No. 2 southern foundry	14.25 to 14.75
Malleable	14.50 to 15.00
Gray forge	**14.75 to 15.00**

Ferro-Alloys.—An eastern consumer has an inquiry out for 160 tons of ferro-manganese for last half and apart from this business is confined to carloads at unchanged prices. The inquiry for 50 per cent ferro-silicon continues of occasional carloads and the market seems a trifle easier. We quote 80 per cent ferro-manganese at $36.50 to $36.75, Baltimore, and 50 per cent ferro-silicon at from $53 to $53.50, Pittsburg.

Cast Iron Pipe.—Some extremely low prices are being made by eastern pipe works and in some cases these are reported as low as $19, foundry, for the heavier sizes. The 17,000 tons involved in the recent contractor's letting in the metropolis is expected to develop some low levels when it is finally placed with the shops. The contractors are still shopping about for this pipe. R. D. Wood & Co. is reported to have taken the 1,200 tons for Lynn, Mass. Yonkers, N. Y., is taking bids this week on 1,200 tons. Conditions in the market are spasmodic, showing improvement one week and relapses the next. We quote 6-inch pipe at from $21 to $21.50, f. o. b. New York in carload lots.

Finished Material.—Buyers have shown practically no response to the reduction in finished prices and business has been quieter the past week. This condition is not unusual following a reduction in the market, as consumers are apparently awaiting to see whether further cuts will not be forthcoming and are holding up their orders in the meantime. Manufacturers declare the quietness of the market is fully in keeping with their expectations in making the reductions which were precipitated by the individual action of the Republic Iron & Steel Co., as it was not expected that business would be stimulated. It is stated in authoritative circles that as far as can be foretold at this time, there will be no further revision downward of prices.

The Carnegie Steel Co., in conformity with the lower mill quotations, has revised its schedule of warehouse quotations in the east by a cut of 10 cents per 100 pounds from the Waverly, N. J., store. The minimum base quotation of the new store schedule is 1.90c, Waverly, for plates and shapes and 1.80c on steel bars.

Structural activity in the east has received a setback from the reduction of plain material prices because buyers are reluctant to close pending contracts under ruling conditions, but it is not expected that this condition will long prevail, as business has been held back so long in this line that it is not thought it can be restrained indefinitely. Prior to the cut in prices, the structural market in metropolitan and eastern territory was showing encouraging activity through work which had been accumulating for some time coming out more freely.

Though the contract has not yet been formally placed, it is understood that the Bamberger store, Newark, N. J., 6,000 tons, will go to the Hay Foundry & Iron Works; the American Express Co. building, Thirty-third street, this city, 1,200 tons, has been awarded the Eastern Steel Co. by the general contractor, James Stewart & Co.; the Jarmulowsky bank building, Canal and Orchard streets, this city, revised to 800 tons, has gone to the Radley Steel Construction Co.; the American Bridge Co. has taken 800 tons for the Peck, Stowe & Wilcox plant, Southington, Conn., 700 tons for the Commercial National Bank building, Charlotte, N. C., and 140 tons in five small bridges for the Boston & Maine railroad; the Riverside Bridge Co. has 500 tons for the Wheeling Electric Co. power station, at Wheeling, W. Va.; the Pennsylvania Steel Co. will get 250 tons for the Atlantic Coast Line bridge at Cape Fear, and the Baltimore & Ohio railroad has placed 500 tons with an independent shop for grade crossing bridges in Chicago. Snare & Triest are the low bidders for the general contract for the towers and reinforcement of the Williamsburg bridge, this city, which will require 2,700 tons. The Rueger hotel, Richmond, Va., about 800 tons, is up for bids, as well as a station for the New York Central railroad, at Rochester, 600 tons. The addition to the American Exchange bank, this city, has been indefinitely held up.

No action has yet been taken on the 36,000 tons for the first portion of the Hell Gate bridge, upon which bids were entered a week ago. The tenders are now under consideration by the officials of the Pennsylvania railroad, which is fathering the Connecting Railroad Co., formed to carry out this project. It is expected that an award of this work will be shortly made and it is not anticipated that the reduction in plain material prices made after the bids were submitted, will exercise a retarding influence in this project. Four bids, it is reported, have been entered.

We quote for delivery at tidewater as follows:

Angles, 3 to 6 inches and heavier, 1.51c; tees, 3 x ¼ inch and heavier, 1.51c; plates, carload, tank, 1.51c; boiler steel, 1.61c; marine boiler, 1.91c; bar iron, 1.30c to 1.35c; soft steel bars, 1.41c.

Old Material.—Buyers continue to close in a small way and in a rather indifferent manner and the market is not displaying much life. Brokers are closing on some short contracts at higher prices than the mills will pay. One lot of 500 tons of heavy steel at $13.25 delivered is noted. City wrought has sold this week at $14.50 delivered in the east and No. 1 railroad wrought is about 50 cents higher. A small lot of Panama scrap was sold at this port this week at $9.58 per gross ton, tidewater. We quote gross tons prices New York dealers will pay at tidewater with the exception of cast scrap which has a local demand, as follows:

Old car wheels	$11.50 to 12.00
Old iron axles	11.50 to 12.00
Old steel shafting	14.00 to 14.50
Heavy melting steel	10.75 to 11.00
No. 1 R. R. wrought	12.00 to 12.50
Iron track scrap	11.00 to 11.50
Wrought pipe	10.00 to 10.50
Cast borings	5.75 to 6.00
Wrought turnings	6.00 to 6.50
Heavy cast scrap	11.50 to 12.00
Railroad, malleable	10.00 to 10.50
Stove plate	9.00 to 9.25
Grate bars	9.00 to 9.50

The Bessemer Gas Engine Co., Grove City, Pa., has received orders for a 40-horsepower Bessemer for the new factory being built at Coudersport, Pa., by the Currier-Koeth Co., and a Bessemer gas engine for the new factory being built at Covington, Ky., by the Kelley-Koett Mfg. Co.

Directors of the Taylor Coal & Coke Co. have elected the following officers: President, F. K. Moore, Cleveland; vice president, H. A. Fuller, Cleveland; secretary, S. A. Fuller, Cleveland.

PHILADELPHIA

Pig Iron Activity Limited to Basic—Inquiry for Coke.

June 6.

Pig Iron.—Tonnage transactions in the eastern Pennsylvania market continue to be limited chiefly to basic iron. Some additional sales have been made and some other recent transactions have come to light, so that it is apparent that a large amount of iron of this grade has been involved in this business, some of which has previously been reported. Including some additional tonnage just closed for, one leading eastern steel works is understood to have covered for about 25,000 tons for third and fourth quarter shipment at prices of $14.50 and $14.75, delivered. It seems clear that the $14.50, delivered, price on basic in the east is quite limited and some of the most recent sales have been at higher prices. One sale for a tonnage not yet determined, which is regarded as practically closed, has just been done at $14.75, delivered. Another consumer is making offers on a lot of 10,000 tons for forward shipment. Sales in other grades are still largely confined to regular customers and for small lots. One of the cast iron pipe companies in this territory has closed for 4,000 tons of southern No. 3 and gray forge for July and August shipment. Recent sales of such southern grades have been made in this territory at $9.50, Birmingham, and No. 2 has been offered at $10.25, Birmingham, for forward shipment. A locomotive interest has taken 1,000 to 1,500 tons of northern gray forge for June, July and August shipment. Some additional sales of Virginia iron have been made, but this has been chiefly for the leading producer in that territory at $12.25 and $12.50, furnace, for No. 2X, as the other makers are not anxious to sell freely at this level. Eastern Pennsylvania iron, which recently weakened somewhat, can be had without trouble at $15.25 to $15.50, Philadelphia, for No. 2X. Sales of more than 1,000 tons of standard low phosphorus for western shipment are reported on an equivalent basis of $20.50 to $20.75, Philadelphia. One of the Heckscher furnaces, which has been on basic, has blown out.

We quote for prompt and third quarter shipment as follows:

No. 1X foundry	$15.50 to 15.75
No. 2X foundry	15.25 to 15.50
No. 2 plain	15.00 to 15.25
Standard gray forge	14.75 to 15.00
Basic	14.50 to 14.75
No. 2X Virginia	15.05 to 15.30
No. 2 southern	14.25 to 14.50
Standard low phosphorus	20.50 to 21.00

Coke.—A Schuylkill valley furnace is in the market for 4,000 tons of furnace coke, mostly for delivery over the last half. Usually the furnaces not fully covered have been filling their requirements by spot purchases, but there is not very much of this business at present. Foundry coke is moving in the regular way at prices ranging from $2.10 upward, according to grade.

Finished Material.—The influence of the uncertainty in the minds of buyers as to the stability of the recently reduced prices is still apparent in the market and business is backward. While the business now being held up will probably come through in due season, buyers, as might be expected, still regard conditions as unsettled and prefer to wait their time before closing. With few exceptions, manufacturers do not expect that any considerable stimulation of activity will follow the lowering of the market, at least for some period of time.

Steel bar business is light and in iron bars makers seem more uncertain as to their selling policies, though low prices are prevailing. As an exception to the general rule of conditions, some plate contracts to cover forward requirements are being made at the 1.35c, Pittsburg, or 1.51c, Philadelphia, base. One of the leading eastern plate mills averaged 75 per cent in shipping output during May. Wire makers have been cancelling tonnages held by eastern jobbers under contract, but not specified fully by June 1, as required.

The eastern structural situation seems to have been set back somewhat by the reduction in shapes and lettings are being less freely made. Some of the bridge shops bidding in the competition for the Hell Gate bridge, New York, have obtained permission to withdraw their original tenders and to submit revised figures to include the $1 a ton reduction in shapes and plates.

R. D. Wood & Co. are in the market for 4,000 tons of plates for two gas holders, for California delivery, the contract for which has just been taken. The United States Steel Products Co. has been awarded, by the government, 2,500 tons of shapes for the Pearl Harbor improvement, Hawaii Islands, at $133,315, or 2.65c, delivered. The Jones & Laughlin Steel Co. was second on this order with a bid of $137,950, or 2.77c, delivered. Bids go in Saturday for 2,000 to 2,500 tons for the West Philadelphia high school. The Lehigh & New England has out a number of small bridges. No decision has been reached for 800 tons for a highway bridge at McElhattan, Pa.

The Virginia Bridge & Iron Co. has taken 800 tons for the Norfolk Terminal building, Norfolk, Va. Plans are being prepared for a hotel at Wilmington, Del., calling for 1,200 tons, and bids have gone in on 400 tons for the First National Bank building at Johnstown, Pa.

We quote, for delivery in Philadelphia and vicinity, as follows:

Structural shapes, 1.51c; steel plates, 1.51c; steel bars, 1.41c; refined bar iron, 1.27c to 1.32c; cut nails, $1.75 to $1.80; blue annealed sheets, No. 10 gage, 1.65c; 4 x 4-inch open-hearth rolling billets, $24.40; forging billets, $30.40.

Old Material.—Large sales are lacking and market values continue to be quotable upon the basis of small trading in which lots sold at sacrifices occasionally figure. The condition prevails where good-sized blocks could probably not be obtained except at some advance over the quotable level. For any quantity of first grade melting steel, buyers would probably be obliged to pay from $13 to $13.25, delivered, most likely the latter. Wrought pipe is easier, as leading eastern buyers will not pay over $12, delivered. The government is offering 2,011 tons of mixed Panama scrap for bids at this port, June 8.

A leading eastern Pennsylvania works recently bought 5,000 tons of long rails at $15.65, delivered, and 2,000 to 3,000 tons of first quality heavy melting steel at $13.25, delivered.

We quote gross tons, delivered at principal eastern Pennsylvania and New Jersey consuming points, as follows:

Old iron rails	$16.50 to 17.00
Old steel rails (re-rolling)	13.75 to 14.00
Heavy melting steel	12.75 to 13.25
Old car wheels	13.00 to 13.50
Old steel car axles	18.00 to 19.00
Old iron car axles	25.00 to 26.00
No. 1 R. R. wrought	15.00 to 15.50
Wrought pipe	12.00 to 12.50
Cast borings	7.50 to 8.00
Wrought turnings	8.50 to 9.00
Heavy cast scrap	13.00 to 13.50
Railroad malleable	11.50 to 12.00
Stove plate	10.00 to 10.50

Freight rates per ton on scrap from Philadelphia to principal eastern consuming points are: $0.60 to Ivy Rock, Pa.; $0.65 to Phoenixville, Pa.; $0.80 to Coatesville, Pa.; $0.85 to Bethlehem, Pa., Reading, Pa., and Roebling, N. J.; $1.10 to Pottsville, Pa., Lebanon, Pa., and Columbia, Pa., and $1.20 to Harrisburg and Steelton, Pa.

To Honor Guests.—The Employers' Association of Cleveland is giving a luncheon in honor of General Harrison Gray Otis, of Los Angeles, at noon today in the assembly room, Hollenden Hotel. Other guests who will be present are John Kirby, president of the National Association of Manufacturers, and Walter Drew, counsel for the National Erectors' Association.

First Sheet Rolled.—The first steel sheet in the new Gary, Ind., works of the American Sheet & Tin Plate Co., was rolled June 1, in the presence of President E. W. Pargny and other officers. This was more in the nature of a test of the mills. Regular operations will not be started for several weeks.

ST LOUIS

Some Pig Iron Sales Last Week, But No Present Inquiries.

June 5.

Pig Iron.—Transactions in pig iron in the St. Louis territory last week exceeded anything that has been recorded for quite a while. In addition to sales in Iowa, consisting of 3,600 tons of southern No. 2, 2,000 tons of southern No. 2 and 1,000 tons of malleable, the sales in small lots in the immediate locality of St. Louis totaled 2,200 tons for the week. One concern closed a contract in St. Louis for 800 tons for actual needs. When the week's business was footed up, local sales agents expressed surprise at the magnitude of it. The market today, however, is almost devoid of inquiries. Prices for the best grades of southern iron, delivered, to which the Birmingham freight of $3.75 has been added, follow:

Southern No. 1	$14.75
Southern No. 2	14.25
Southern No. 3	14.00
Southern No. 4	13.75

Coke.—The market for coke remains dull, with prices unchanged, as follows:

We quote 72-hour Connellsville foundry grades, $1.90 to $2.40 for whole of 1911; 72-hour foundry, $1.90 to $2.15 on tracks and for immediate delivery; 48-hour Connellsville furnace, $1.40 to $1.50; best 72-hour Virginia foundry, $2 to $2.25; 48-hour Virginia furnace, $1.60 to $1.85. The freight to East St. Louis and St. Louis is $2.80, and $2.70 from the Virginia fields when shipment is destined beyond St. Louis.

Finished Material.—The demand for structural steel is a little quiet, with prices somewhat unsettled, and not much buying is looked for until conditions settle down. A slight improvement in bars is noted, with prices ruling at 1.25c, Pittsburg basis. The Kansas City Southern railroad has closed a contract for about 14,000 tons of standard steel rails, half of which was captured in St. Louis and half by a Pennsylvania furnace. A contract also was closed last week for 750 tons of standard steel rails. Plates are in fair demand at 1.35c.

Old Material.—The demand for scrap continues at a low ebb, with prices unchanged, as follows:

Old car wheels	$12.50 to 13.00
Old iron rails	13.50 to 14.00
Rerolling rails (4 ft. and over)	12.00 to 12.50
Old steel rails (2 ft. and under)	11.00 to 11.50
Light section relayers, 45 lb. and under, subject to inspection	19.50 to 22.00
Relaying rails, subject to inspection	24.00 to 24.50
Frogs, switches and guards	11.50 to 12.00
Heavy melting steel	11.50 to 12.00
Shoveling steel	11.00 to 11.50

We quote, net tons, as follows:

No. 1 R. R. wrought	$11.00 to 11.25
No. 2 R. R. wrought	10.00 to 10.25
Arch bars and transoms	13.25 to 13.50
Knuckles, couplers and springs	12.00 to 12.50
Shafting	14.25 to 14.50
Iron car axles	18.00 to 18.50
Steel car axles	17.00 to 17.50
Locomotive tires	14.00 to 14.50
No. 1 country wrought	9.50 to 10.00
Pipes and flues	8.00 to 8.50
No. 1 busheling	9.25 to 9.50
No. 2 busheling	6.00 to 6.50
No. 1 boiler cut	7.50 to 8.00
Boiler punchings	9.00 to 9.25
Cast and mixed borings	5.00t o 5.50
Machine shop turnings	6.50 to 7.00
Railroad malleable	9.50 to 10.00
Agricultural malleable	8.50 to 9.00
Stove plate	9.00 to 9.50
Angle splice bars, iron	11.75 to 12.25
Angle splice bars, steel	11.00 to 11.50

BUFFALO

Pig Iron Buyers Hold Off, But Improvement Expected.

June 6.

Pig Iron.—The past week has produced very little new business and the market is still feeling the depression which has been very marked ever since the reductions in finished steel products were announced. In spite of the statements of the furnaces that there will be no reductions in the prices of iron, buyers are still holding off, but the furnaces look for a somewhat larger volume of business in the new week. Inquiries have been very few this week. A few have come from out of the district including one from the New England territory for about 1,000 tons of different grades. The only sales reported have been in small lots, and not many of them. Shipments are going forward well.

We quote, f. o. b. furnace:

No. 1X	$14.00 to 14.50
No. 2X	13.75 to 14.25
No. 2 plain	13.50 to 14.00
No. 3	13.25 to 13.50
Gray forge	13.00 to 13.25
Malleable	13.75 to 14.25
Basic	14.25 to 14.75
Charcoal	16.50 to 17.50

Finished Products.—Some improvement is noted, but on the whole specifications have not been coming in very well in spite of reduced prices. A few structural jobs will be let soon, and a general improvement is expected.

Old Material.—Business has been very dull and the only sales made have been small. We quote gross tons, f. o. b. Buffalo, as follows, the prices being largely nominal:

Heavy melting steel	$12.75 to 13.00
No. 1 railroad wrought scrap	14.75 to 15.25
No. 1 railroad and machine cast scrap	14.00 to 14.50
Old steel axles	18.50 to 19.00
Iron axles	23.00 to 24.00
Car wheels	13.75 to 14.25
Railroad malleable, scrap	13.75 to 14.00
Machine shop turnings	7.00 to 7.25
Cast iron borings	6.50 to 6.75
Low phosphorus steel scrap	17.00 to 17.50
Old iron rails	16.75 to 17.25
Tank iron	10.75 to 11.25
Sheet iron	6.50 to 7.00
Pipes and flues	10.75 to 11.25
Stove plate	12.00 to 12.50
Grate bars	11.50 to 12.00
Boiler plate	11.50 to 12.00

BIRMINGHAM

Selling Price of Pig Iron Closely Approaches Cost Line.

June 5.

Pig Iron.—Sales reported through all local offices during the past week aggregate less than 5,000 tons, without indications at this time upon which to base expectations of a larger volume of business the present week. No report has been made of any sales at a lower figure than $10.50 per ton, Birmingham, for No. 2 foundry, which is now the established quotation for deliveries extending through the remainder of this year, but even at this figure the weakness of the market generally is very apparent. Few inquiries are being submitted and buyers in practically all cases seem disposed to provide for actual requirements only. As a result of such a disposition recent sales have ranged from carload lots to lots of 500 tons all for delivery during the next 60 to 90 days. The tonnage that has been sold so far at the reduced prices has been placed practically with three producers. The smaller producers have withdrawn from the market by reason of the decline, and it is quite likely that with present prices ruling for 60 days considerable additional idle capacity will result owing to the inability of certain producers to produce at a less figure than present low selling prices.

The furnace operations in this district were unchanged during the month of May, but in the majority of cases a very significant part of the output was stored on furnace yards. At this time furnace reports as of June 1 are not available, and such returns are being awaited with much interest, perhaps more especially because of the disposition among melters to allow the tonnage engaged at higher prices than now prevail to remain on furnace yards. The tonnage that is now being held up against contracts is quite an item in summarizing market conditions, and rumors indicate that foundry operations are to be curtailed very materially prior to June 15. There have been no recent developments as to basic iron and the productive activity is still represented by three blowing stacks.

We quote the market as very unsteady at prices below for deliveries covering the remainder of the year, all per gross ton, f. o. b. cars furnace yards in the Birmingham district:

No. 1 foundry	$11.00 to 11.25
No. 1 soft	11.00 to 11.25
No. 2 foundry	10.50 to 10.75

No. 3 foundry	10.00 to 10.25
No. 4 foundry	9.75 to 10.00
Gray forge	9.50 to 9.75
Basic	10.50 to 10.75

Cast Iron Pipe.—A very attractive tonnage in the shape of the requirement for the city of San Diego, Cal., is understood to have been placed in this market during the past week, but the price consideration cannot be ascertained at this time. The tonnage represented by the small orders for maintenance work, placed during the week, is comparatively small, and with prices about the same as those received during the week previous. A fairly attractive volume of business is represented by the inquiries pending, but because of the continued weakness in the raw material markets, producers are more or less apprehensive of ultimate developments in prices offered for large contracts. From present indications the capacity now in operation will be well taken care of during the summer months, but it is very unlikely that sufficient tonnage will be offered to warrant the resumption of operations at plants that are idle. We do not see fit to revise quotations, but quote that market as nominal with prices as follows ruling for water pipe, per net ton, f. o. b. cars here: Four-inch to 6-inch, $23; 8-inch to 12-inch, $22; over 12-inch, average $21, with $1 per ton extra for gas pipe.

Coal and Coke.—Contracts for 1911-1912 coal requirements are being entered into freely and prices received are very close to those considered in contracts now expiring. The consumption is probably less than it was 30 days past, which is accounted for by general conditions prevailing throughout the country. There has been a slight decline in coke quotations owing to the continued low rate of consumption at the Alabama furnaces, but contract prices are being maintained. Standard Alabama 72-hour foundry coke is quoted at from $3.25 to $3.50 per net ton at ovens, while West Virginia and Virginia brands are being offered in this market at from $2 to $2.25 per ton ovens.

Pig Iron Sales Fall Off and Foundry Work Slackens.

June 1.

Pig Iron.—Sales of pig iron in the northwest are limited to very small lots and at rock bottom prices. There seems to be very little market for the product and practically no foreign iron is being sold. A jobber reported inquiries from two firms early in the week, but these negotiations fell through at a time when the sale was about to be consummated. The lumber mills seem to be well stocked with supplies and are having very little repairing done. At the same time the lumbermen have decided to curtail their output by one-half until the lumber market gets into better condition and there is evidence that the mills are not over-producing and this has its effect on the other lines of trade. Some of the foundries have cut down their forces and others are running on part time. Railroad work is the only bright spot in the northwest field and very little iron has sufficed to do for their demands. We quote foreign iron in gross tons ex-ship Puget Sound or Columbia river delivery, f. o. b. Pacific coast terminals, as follows:

	Prompt.	Third quarter.
No. 1 Glengarnock	$23.50	$23.50
No. 1 Eglinton	22.50	23.00
No. 1 English Jarrow	22.50	22.50
No. 1 Chinese Hanyang	22.00	22.00
No. 1 Cleveland	22.50	22.50
English Doncaster	22.00	22.00

Finished Material.—With the curtailment as noted above in the lumber trade has come a general falling off in the demand for finished material. Even the cities that were in the market and contemplating further improvements have gone slow during the past week. The deliveries of sheets and soft bars have been heavy for the past two weeks, but there have been few new orders.

Coke.—Washington state coking firms are making additions to their forces and are preparing more strongly to go after new business in the Puget Sound markets. At Wilkeson, Wash., new plants are being constructed and a general increase in the production is looked for. Pierce and King counties are turning out a good grade of coking coal and with the improvement of facilities for handling the product a strong bid will be made to supply the foundries more satisfactorily. The cost of labor is the biggest factor in the coking business at present.

British Iron Market

Pig Iron Has Dropped and Crude Steel Price is Lower.

Office of THE IRON TRADE REVIEW,
Prince's Chambers, Corporation St.,
Birmingham, Eng., May 27.

For the first time for many weeks, the iron markets this week have shown a more hopeful tone. In the Cleveland district, a decided movement upwards commenced, which looked like continuing, but there was a fall yesterday of 5d, the sole reason for which, apparently, was the American report that an era of price-cutting had set in. There has been a fall of 7d since Wednesday, but this still leaves prices with some gain on the week. There has been also a reduction in stocks owing to a marked improvement in shipping. The amount in store is now 591,354 tons. Buyers will undoubtedly make the most of the latest suggestions of renewed depression, but it is clear that a turn for the better has taken place. Recent shipments have been the largest in any month for three or four years, and for several days in succession there was a decline in stocks. Yesterday's selling figure was 46s 6d ($11.38) cash, with 46s 9d ($11.44) for No. 3 and an addition of another 9d for delivery next quarter. In other districts, consumers are evidently concluding that the time has arrived to buy, and on the Birmingham market there was a considerable amount of contract renewal on Thursday.

In the finished department, there is some little sign of improvement in most lines, and the outlook is fairly cheerful. But there has been a slump in the billet market, owing to the influx of foreign billets, coming chiefly from Belgium. The British agents for Belgian works have this week further reduced their prices, making 2-inch billets 90s. Coincidentally with this reduction comes the news of the threatened stoppage at the end of May of the Ebbw Vale Steel Works. The explanation given is the large quantity of foreign steel dumped into Great Britain. According to the manager of the works, during the first four months of the present year, 600,000 tons of crude steel have been imported which, he said, was enough to keep the Barrow, Blanaevon, Dowlais, Workington and Ebbw Vale Works all going at full rate. The prices of crude steel are quite 5s below recent quotations, chiefly on account of the foreign competition, but recent visitors to the continent declare that competition between Belgian houses is much keener even than with the British mills.

METAL MARKETS

St. Louis.

June 5.

Zinc and Spelter.—Choice grades of zinc ore brought $43 a ton in the Missouri-Kansas-Oklahoma district last week, with 60 per cent lots selling in the open market for $37 to $38 a ton, based on the average spelter quotations at East St. Louis of 5.20c, the lowest of the year. The general

average base price was $38 a ton, but ore selling in less than car lots brought a much lower price. Calamine showed very little change, ranging from $19 to $21 a ton on an assay base of 40 per cent grades, while choice lots sold as high as $27 a ton. Lead ore remained at $54 to $58 a ton. The zinc surplus in the district was estimated at 9,400 tons at the close of the week, of which 7,200 tons could not be bought at present prices.

New York.

June 6.

Tin.—The previous high point for spot tin, which was reached only twice during the past 35 years, once in 1877 and again in 1906, was passed, June 2, by a margin of £1. Syndicate operations worked the price up to £216 and closed the market at £215 at the end of the week. The London metal exchange was closed Monday, it being a church holiday, but the local market for spot and June tin advanced to 47.40c on light buying by consumers to meet pressing needs. At the opening of the foreign market today the bulls stampeded opposition to rising prices, and spot was advanced to £220, and futures to £194 during the morning session. A reaction of £6 in spot and £1 5s in futures took place before business closed for the day. Spot closed at £214, and three months £192 15s. Tin for early delivery has become very scarce in the domestic market, and dealers are unable to figure on inquiries beyond the stock of metal they have on hand, which as a rule is very small. Sales were made today at 48c and 48.25c. The closing price for spot and nearby is 48c. Arrivals of tin since June 1 aggregate only 380 tons, and 250 tons have been exported during the same time. It is the sentiment of the local trade that the metal will command a large premium over London prices before the end of June. There are only 1,003 tons afloat for Atlantic ports.

Copper.—There are no indications to prompt the belief that domestic consumers have renewed interest appreciably in the copper metal market. Producers, however, are holding prices firm and claim to have done a good business with foreign buyers. The market for electrolytic is generally considered to be 12.37½c cash and 12.50c, delivered, 30 days. Lake is quoted at from 12.37½c to 12.50c. It is very probable, however, that those figures could be shaded from 5 to 7½ points. Due to the conflicting reports regarding sales of copper during May, a forecast of what the report of the Copper Producers' Association will show can be of little value. It may be stated, however, as trade gossip, that general belief favors an increase of about 10,000,000 pounds in surplus, as the probable resultant. The exports since June 1 are 4,981 tons.

Lead.—There is no change in the lead market. Independents are offering prompt shipments from the west at 4.37½c and the leading interest remains at 4.50c.

Spelter.—The slight improvement noted in St. Louis has sentimentally strengthened this market for spelter. Consumers show little interest in the metal, however. Prime western is quoted at 5.40c in New York.

Antimony.—All brands of antimony are quoted at reductions from last week. Cookson's is 9c, Hallett's is 8.87½c and Hungarian is 7.62½c.

Chicago.

June 5.

New Metals.—There have been large sales of copper to consumers for deliveries running through July and August, but during the past week orders have been chiefly for prompt shipment. Consumers in this territory are generally taking deliveries at about the same rate as in the past six months. Predictions are heard that tin will go to 50c on account of the shortage in the visible supply in this country.

We quote, dealers' selling prices, f. o. b. Chicago, as follows:

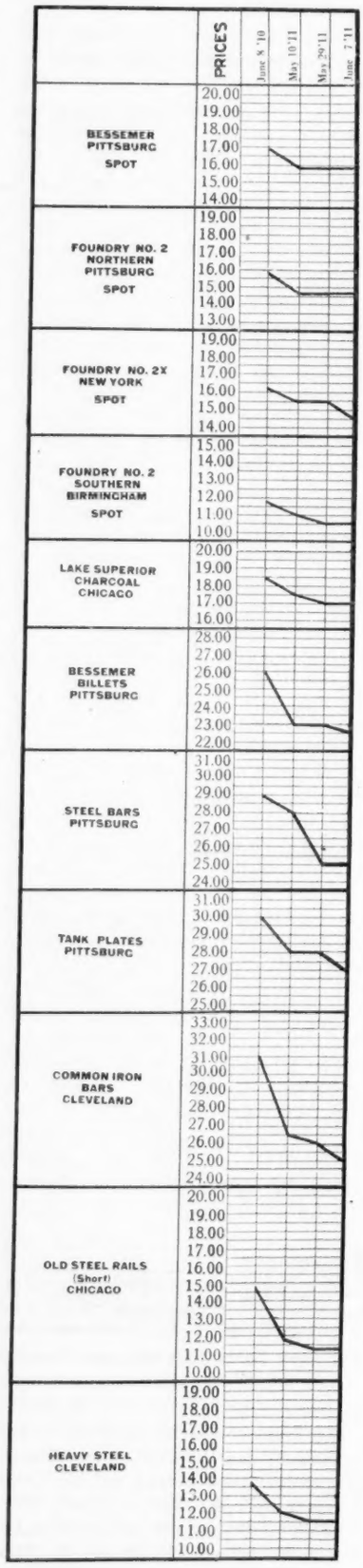
Lake copper, carload lots, 12⅝c to 12¾c; casting, 12½c; smaller lots, ¼c to ⅜c higher. Spelter, car lots, 5.35c to 5.40c; lead, desilverized, 4.32½c to 4.35c in 50-ton lots; corroding, 25c per 100 pounds higher; sheet zinc, $7.25 list, f. o. b. La Salle, in car lots of 600-pound casks; pig tin, 47½c; Cookson's antimony, 10¼c; other grades, 9c to 10c.

Old Metals.—There is practically no change in the values of old metals. The demand is somewhat less from foundries and other consumers and orders are generally limited to small lots for immediate requirements.

We quote, dealers' selling prices, f. o. b. Chicago, as follows:

Copper wire, 12c; heavy copper, 11⅞c; light copper, 10½c; heavy red brass, 10½c; heavy yellow brass, 9c; light brass, 7c; No. 1 red brass borings, 9½c; No. 1 yellow brass borings, 7½c; brass clippings, 8½c; tea lead, 3.80c; lead scrap, 4½c; zinc, 4½c; tin pipe, 37c; tin foil, 34c; pewter, 27c; electrotype plates, free from wood, 4c; electrotype dross, 3c; stereotype plates, 4½c; stereotype dross, 3¼c; linotype dross, 3¼c; prime slab zinc dross, $70 per ton.

PRICE CHART



WITH BANKING ALLY

Machinery Builders Will Seek to Increase Foreign Sales.

The Allied Machinery Co. of America, with a capital of $100,000, has been incorporated under the laws of New York state for the purpose of pushing the sales of American machinery and machine tools in foreign countries. The plan of operation is to cultivate those orders for machinery and machine tools wherein the making of loans or banking accommodations is an essential factor in the awarding of the business. Often in the past the inability of the American manufacturer to take care of this feature of the transaction has resulted in the loss of the order to him, despite the appreciation abroad of the high merit of the American tools. With the cooperation of the National City Bank of New York, and its agencies, the new company, which is practically an export association, hopes to overcome this obstacle encountered in former sales. The directors of the company are principally officials of the National City Bank, together with Capt. Godfrey L. Carden, of the United States revenue cutter service, who has made a thorough investigation of the machine tool trade conditions in Germany, France, Italy, Switzerland, the United Kingdom, Belgium, Austria-Hungary, Denmark, Russia and the Netherlands, for the department of commerce and labor. The officers of the company are: President, Samuel McRoberts; vice president and general manager, G. L. Carden; treasurer, Thomas A. Reynolds, and secretary, H. C. Newlands. More than 60 companies are associated with the enterprise for the development of the American foreign trade in machinery. President McRoberts and General Manager Carden have sailed for Europe to arrange for the establishment of selling offices and to enroll organizations in the different cities of Europe. A base of operations is to be established in Paris. At present, Russia and Austria are the only two European countries which it has been decided to enter in a specific way in addition to the general European campaign conducted from Paris.

Creditors of Henshaw, Buckley & Co., one of the largest machinery houses on the Pacific coast, filed a petition in involuntary bankruptcy, Saturday. Liabilities are estimated at $500,000. The petition was signed by the B. F. Sturtevant Co., Crane Co., Orton Machinery Co., Pacific Coast Foundry Co. and Asbestos Mfg. Co. Action was taken to stay execution secured by Los Angeles creditors, and the court issued an order restraining all levies on property.

Pittsburg Foundrymen Elect Officers

At the annual meeting of the Pittsburg Foundrymen's Association, held Monday night, June 5, in the rooms of the Engineers' Society of Western Pennsylvania, Oliver building, Pittsburg, officers were elected and reports for the year were read. W. A. Bole, of the Westinghouse Air Brake Co., was elected president; Eliot A. Kebler, M. A. Hanna & Co., vice president; John McLaren was re-elected treasurer, and F. H. Zimmers, who has been secretary of the Pittsburg association since it was organized 15 years ago, was re-elected secretary. The following were elected members of the executive committee: J. S. Seaman, Henry R. Spilker, C. W. Jones, E. D. Frohman and J. S. McCormick. Short addresses were made by the retiring and newly elected officers. The report of the treasurer, Mr. McLaren, showed a balance of $922.27 in the treasury, as compared with $667.53 a year ago. The report of Secretary Zimmers showed a total of 148 active and five honorary members, as compared with 127 active and four honorary members on June 1, 1910. Secretary Zimmers read a letter from Richard Moldenke, secretary of the American Foundrymen's Association, expressing sincere thanks and appreciation for the work of the Pittsburg foundrymen in connection wth the recent annual convention of the American Foundrymen's Association held in Pittsburg. A resolution was adopted thanking members of the various committees for their work in connection with the convention. The next meeting of the association will be held Sept. 11.

Wage Scale Conference Opened

The annual wage scale conference between the Western Bar Iron Association and the wage scale committee of the Amalgamated Association of Iron, Steel and Tin Workers, opened last Monday at Cambridge Springs, Pa. The Amalgamated Association has asked for a renewal of the 1910-11 wage scale, but it is not likely that the manufacturers will agree to a renewal of the present scale.

NEW YORK ORE

In 1910 Reached Highest Figure—Output Distribution.

Production of iron ore in New York state in 1910 was 1,517,880 gross tons, the largest in the history of the state, according to the annual report of State Geologist John M. Clarke. A part of this ore in the crude state was too lean for blast furnace use and after the reduction of this portion to concentrates, the net total of merchantable ore was 1,159,067 tons, compared with 991,008 tons in 1909. The value of the output was $3,906,478, compared with $3,179,358, last year. Says the report:

In view of the somewhat unfavorable conditions which characterized the iron trade generally last year, the showing must be considered very satisfactory. There was not the stimulus of high prices to encourage enterprise as in some years when a more active demand prevailed.

The output last year was contributed by 13 mining companies, who operated in nine different counties.

Highest Towers for Wireless

The bureau of yards and docks, navy department, is calling for bids, to be opened June 17, for the construction of one 600-foot and two 450-foot towers on the United States Reservation at Arlington, Va. These will be of structural steel in a suitable base, and will far exceed in altitude any similar structure yet attempted. Their use is expected to develop much interesting progress along scientific lines which has been hitherto unattainable with the aerial of ordinary height. It will be remembered that the use of Washington monument for a wireless tower was mooted and has actually been the subject of serious discussion, but high art was victorious over high science; hence the proposed purchase of steel towers.

Furnace Badly Damaged

The plant of the Belfont Iron Co., at Ironton, O., was so badly damaged by a wind storm on June 5, that the blast furnace will be immediately blown out and indefinitely closed down for repairs. The pig casting house, casting machine, power plant and the stack of the furnace were partly wrecked.

Erie Specifies.—The Erie Railroad has filed specifications for 17,000 tons of steel rails contracted for some time ago.

MORE COAL LAND

Purchased by Steel Corporation on Monongahela River.

In addition to the purchase of 7,200 acres of coking coal land, including approximately 1,000 coke ovens with a monthly production of 55,000 tons of high grade furnace coke, from the Pittsburg Coal Co., Pittsburg, by the United States Steel Corporation, noted last week, the latter has practically closed negotiations for the purchase of between 8,000 and 9,000 acres of coal land owned by the Monongahela River Consolidated Coal & Coke Co. The price paid by the Steel Corporation for these properties is understood to be in the neighborhood of $18,000,000, on which the purchasing company will have about 35 years time to make payments. The property purchased from the Monongahela River Consolidated Coal & Coke Co. adjoins the coal holdings of the Jones & Laughlin Steel Co. and other steel companies in the Monongahela river valley. This company has frequently discussed plans for building coke ovens, but the property has not been developed.

The 1,000 coke ovens purchased from the Pittsburg Coal Co. are operated by the Colonial Coke Co., which has four plants. The output about 55,000 tons a month, is sufficient to cover the full requirements of three or four blast furnaces, and, as the deal just closed takes this coke off the market, it is the opinion of the coke producers that the transaction will greatly benefit the coke market. It is a matter of record that the Colonial Coke Co. has operated at greater capacity, in proportion to the number of ovens, than most of the other independent producers of coke.

It is understood that these properties will be turned over to the H. C. Frick Coke Co., a subsidiary of the United States Steel Corporation, for development and that a large portion of the coke and coal will be shipped to the plants at Gary, Ind.

Iron Ore Receipts.—Receipts of ore at Lake Erie ports during May were 2,633,357 gross tons out of a total shipment of 3,684,819 tons. Conneaut led with 714,453 tons, Ashtabula second wth 676,542 tons and Cleveland third with 480,602 tons. The receipts by ports follow:

Port.	May, 1911.
Buffalo	328,241
Erie	27,287
Conneaut	714,453
Ashtabula	676,542
Fairport	85,415
Cleveland	480,602
Lorain	265,417
Huron	12,623
Sandusky	.....
Toledo	23,044
Detroit	18,733
Total	2,633,357

J. K. Dimmick & Co., Philadelphia, are transferring their general western selling office from 820 Union Trust Building, Cincinnati, to Cleveland, where offices will be located at 1242 Rockefeller bldg. The Cincinnati office will be entirely discontinued. Charles E. Pool, who has been general sales agent in Cincinnati, will be in charge of the Cleveland office, selling "Stone-rite" New River smokeless coal, Fairmont coal, and Connellsville coke.

ORE SHIPMENTS

Made Poor Showing, But Better Than Was Expected.

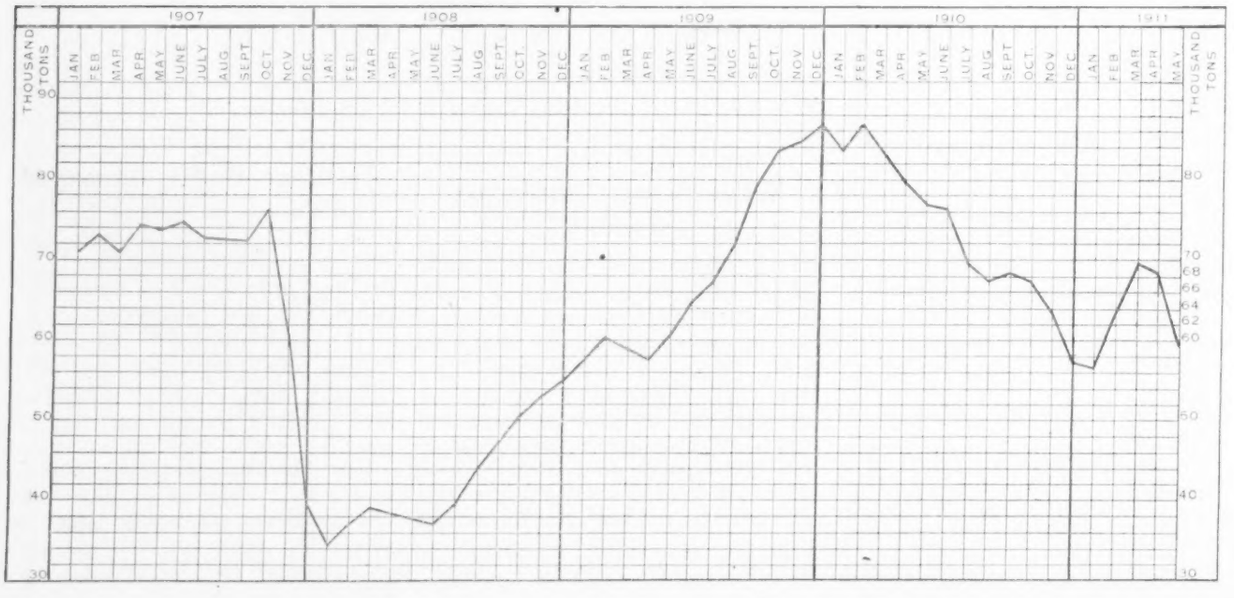
Ore shipments during May were 3,684,819 tons, making the total shipments to June 1 of the present year 4,016,464 tons. This is a decrease of 3,585,201 tons compared with the corresponding period last year, but nevertheless it is better than expected. The June movement will undoubtedly show a respectable increase over May as more vessels have been daily going into commission and the Steel Corporation has begun to charter outside tonnage. While the lake situation is not roseate, it is certainly less discouraging than it appeared two weeks ago. Following are the shipments by ports:

Port.	May, 1910.	May, 1911.
Escanaba	749,091	436,008
Marquette	481,325	204,093
Ashland	588,694	226,528
Superior	955,651	1,239,153
Duluth	2,220,758	896,113
Two Harbors	1,085,929	682,924
	6,081,358	3,684,819
1911 decrease		2,396,539

Port.	To June 1, 1910.	To June 1, 1911.
Escanaba	972,117	529,540
Marquette	616,885	218,931
Ashland	807,307	267,595
Superior	1,310,958	1,315,892
Duluth	2,530,185	947,155
Two Harbors	1,364,213	737,081
	6,081,358	3,684,819
	7,601,665	4,016,464
1911 decrease		3,585,201

Bids for the steel work for the two blast furnaces and the open hearth furnaces of the Minnesota Steel Co. at Duluth are now being taken. Contracts will probably be placed within the next week or ten days.

Chart showing pig iron daily average production



May Pig Iron Curtailment is Significant

Reduction in Output Exceeded 175,000 Tons — Sharp Cut in Daily Average and Active Stacks

Sharper curtailment of the coke and anthracite pig iron production of the country took place in May, according to the completed figures received. This was presaged by the large number of steel plant furnaces which blew out the latter part of April. The total output of all the furnaces in May was 1,869,883 tons, compared with 2,044,904 tons in April, a loss in May of 175,021 tons, although May had one more working day than April. The curtailment is strikingly shown by the comparison of daily average production figures. In April the daily average was 68,163 tons, and in May 60,319 tons, a loss of 7,844 tons. This compares with a reduction in April of the daily average by 1,700 tons, and is the smallest for any month this year except January.

MONTHLY PRODUCTION.

	1911.	1910.	1909.
January	1,766,658	2,599,995	1,788,164
February	1,781,285	2,428,937	1,682,470
March	2,165,764	2,583,736	1,822,644
April	2,044,904	2,477,700	1,730,608
May	1,869,883	2,374,802	1,866,757
June		2,288,279	1,930,029
July		2,158,124	2,088,620
August		2,103,791	2,232,642
September		2,048,461	2,375,589
October		2,086,205	2,604,037
November		1,910,385	2,532,740
December		1,779,899	2,682,702
Total	9,628,494	26,845,314	25,337,002

The most striking showing in reduction was made by the non-merchant or steel plant furnaces. In April they produced 1,458,717 tons, and in May 1,316,276 tons, a reduction in May of 142,441 tons compared with a reduction in April of about 64,000 tons. The merchant stacks produced in April 568,904 tons and in May 537,308 tons, a loss in May of 31,596 tons, whereas they cut their output in April about 55,000 tons as compared with March.

AVERAGE DAILY PRODUCTION.

	1911.	1910.
January	56,989	83,871
February	63,617	86,747
March	69,863	83,580
April	68,163	82,590
May	60,319	76,607
June		76,276
July		69,617
August		67,864
September		68,282
October		67,297
November		63,679
December		57,192

The number of stacks active on the last day of May was 205, compared with 220 active in April, a loss in May of 14 stacks from the active list. The output of spiegel in May was 4,053 tons, compared with 2,458 tons in April, a gain for May of 1,595 tons. The output of ferro in May was 12,246 tons, compared with 14,825 tons in April, a loss in May of 2,579 tons.

MAY PIG IRON.

STATES.	NO. OF STACKS.		NO. IN BLAST LAST DAY OF MONTH.		TOTAL TONNAGE MADE.		TOTALS.	
	May.	Apr.	May.	Apr.	Merchant.	Non-Merchant	May	Apr.
Pennsylvania	157	80	87		147,316	583,943	731,259	860,201
Ohio	71	43	45		113,017	336,675	449,692	465,283
Alabama	45	17	19		117,592	14,212	131,804	146,910
Virginia	24	8	9		26,528	——	26,528	29,174
New York	26	13	13		47,472	84,558	132,030	142,276
New Jersey	7	1	1		5,688	——	5,688	5,150
Illinois	26	14	13		20,010	139,637	159,647	164,106
Colorado	6	3	3					
Indiana	8	6	6		12,087	129,485	141,572	141,210
Maryland	4	3	3					
Wisconsin	6	1	3					
Kentucky	7	1	2					
West Virginia	4	3	3		30,309	27,766	58,075	58,018
Tennessee	19	9	9					
Washington	1	0	0					
Georgia	2	0	0					
Texas	3	0	0					
Minnesota	1	1	1		17,289	——	17,289	15,293
Michigan	3	2	2					
Missouri	1	1	1					
Spiegel—All states							4,053	2,458
Ferro—All states							12,246	14,825
Totals	421	206	220		537,308	1,316,276	1,869,883	2,044,904

LEASE TERMINATED

On Virginia Blast Furnace and Iron Ore Properties.

New York, June 7. (By wire.)

The lease of the Oriskany Ore & Iron Co., of which W. W. Taylor is general manager, on the Buena Vista, Iron Gate, and Shenandoah, Va., blast furnaces and ore mines at the Oriskany property of the Alleghany Ore & Iron Co., a subsidiary of the Lukens Iron & Steel Co., Coatesville, Pa., will expire the latter part of June. The property will be taken over by the Alleghany company and the Iron Gate furnace operated; but the lease on the Buena Vista property has been extended four months to allow the Oriskany Ore & Iron Co. to work up the ore on hand, when the furnace will revert to the owners. The Alleghany company will operate the furnaces on merchant, foundry and car wheel iron, and Rogers, Brown & Co., who have sold the iron for 11 years, will handle the output. The Shenandoah stack is not active at present.

Blast Furnace Notes

Richard Heckscher & Sons Co. blew out No. 1 Swede furnace on May 26.

Oriskany Ore & Iron Co. blew in its Buena Vista, Va., stack on May 24.

Hall furnace of the Republic Iron & Steel Co. blew out May 8, and Atlantic stack of the same company on May 13.

Ensley No. 5 stack of the Tennessee Coal, Iron & Railroad Co. was blown out May 3.

Norton Iron Works, Ashland, Ky., blew out its stack May 12 for repairs.

The stack of the West End Furnace Co., Roanoke, Va., was banked 22 days in May for repairs.

Longdale Iron Co. on May 1 blew out its Longdale, Va., stack and suspended all operations indefinitely.

LaBelle Iron Works on June 1 banked one of its stacks at Steubenville, O.

Star Furnace Co., Jackson, O., blew out its furnace May 11.

Pulaski Iron Co. blew out its Pulaski, Va., stack May 29 for relining.

HEAVIER SHIPMENTS

On Contracts Being Accepted.—Tunnel Work Awarded.

Pittsburg, June 7.—(By wire).

The Pittsburg Construction Co. has received the contract from the New York board of water control for the construction of the proposed high pressure water tunnel under Manhattan Island from the Catskills. The Pittsburg company's bid was $5,190,225. About 2,000 or 3,000 tons of steel will be required.

The railroads are taking heavier shipments against contracts for rails and other material, and the trade looks for heavier buying on the part of transportation companies within 30 days. Sentimentally the steel market shows a slightly firmer tone in the past few days. Two or three steel companies are operating on a slightly better schedule this week. Four of the new open hearth steel furnaces of the Republic Iron & Steel Co., Youngstown, O., will be started within the next three or four days.

Pig Iron Stocks Have Been Reduced

A reduction of about 13,500 tons in the pig iron stocks in the hands of the merchants and steel works furnaces other than the Steel Corporation in the Pittsburg, Valley and Ohio districts, was effected during the last half of May, making the net decrease in the past month about 8,500 tons. During the first half of May, these stocks increased 5,000 tons and during the last half of April, they increased 13,000 tons. Most of the decrease during the last half of May was in the stocks of one of the steel companies which has had a large accumulation of iron. Stocks in the districts covered are now about 867,000 tons, exclusive of the Corporation's accumulations. A total of 34 furnaces out of 57 is blowing, which is a gain of one stack over the previous fortnight.

Personal

John W. Gates has sailed for several months' stay in Europe.

H. A. Berg has resigned as superintendent of the Midland blast furnace plant, Midland, Pa., effective June 1.

C. von Goeben, formerly of New York, has been appointed manager of the Payne & Joubert Machine & Foundry Co., Birmingham, Ala.

Ward W. Jacobs, of Hartford, Conn., is now in the Birmingham, Ala., district looking over the properties of the Shelby Iron Co., of which he is president.

Walter S. Bickley has been chosen president of the Penn Steel Castings & Machine Co., Chester, Pa., succeeding his father, Mortimer H. Bickley, who died April 2.

C. E. Hardy has taken a position as industrial engineer for the Westinghouse Electric & Mfg. Co., at San Francisco. Mr. Hardy was formerly assistant shop superintendent of the manufacturing department at the United States navy yard, Mare Island, Cal.

Horst Peltz, general manager of the German Garbe Boiler Works, is at present in this country to arrange for the manufacturing of the Garbe boiler in the United States. He makes his headquarters with the Wiener Machinery Co., 50 Church street, New York City.

Albert A. Bialas, formerly with the Midland Steel Co. and later a salesman for the S. Jarvis Adams Co., of Pittsburg and Midland, Pa., will hereafter be associated with the Columbia Steel & Shafting Co. as special sales representative. The Columbia Steel & Shafting Co.'s general offices are in the Empire building, Pittsburg.

St. Louis Rolling Mill Incorporation

The proposed rolling mill company for St. Louis, recently organized by William E. Guy, was incorporated under the name of the Laclede Steel Co. last Thursday with a capital stock of $100,000, fully paid up. The stock is held as follows: W. E. Guy, George D. Markham, George O. Carpenter, L. R. Carter, Jay H. Smith and Joseph W. Lewis, one share each; Thomas R. Akin, 994 shares. Mr. Akin will be president, and the capital stock will be increased later to $400,000. It has not been decided whether the company will erect a plant in St. Louis or on the Illinois side of the river.

B. & O. Orders Rails

The Baltimore & Ohio railroad has awarded contracts for 23,050 tons of rails. The contracts are distributed as follows: Thirteen thousand and fifty tons to the United States Steel Corporation, of which 5,000 tons will go to the Carnegie Steel Co. and 8,050 tons to the Illinois Steel Co. The Cambria Steel Co. gets 7,500 tons and the Bethlehem Steel Co. 2,500 tons. The rails are to be 100 and 90 pounds to the yard, excepting 1,100 tons, which will be lighter.

GOVERMENT COLLIERS

Will Require Large Tonnage of Plates—Rail Orders.

New York, June 7. (By wire.)

The National Railways, Hayti, is in the market for 10,000 tons of 56-pound rails and will probably close this week. The Cuban Central has placed 8,000 tons of 60-pound rails with the United States Steel Products Co. The Lackawanna Steel Co. has taken 2,000 tons additional from the Delaware, Lackawanna & Western.

Four government colliers, bids for which go in June 20, will require about 22,000 tons of plates and shapes, about 5,500 tons to each vessel.

Obituary

Joseph R. Woodwell, aged 69, president of the Joseph Woodwell Hardware Co., Pittsburg, died May 31 at the family home, Penn and Murtland avenues, East End.

J. O. Buckley, president of the Queen Consolidated Mines Co., owning mineral acreage in the Sauk county iron district of Wisconsin, and for several years actively engaged in mining and supervision, died after a long illness, at Black Hawk, Sauk county, aged 52. He was born on the farm of the Buckley estate, where he died. Mr. Buckley was a graduate of the University of Wisconsin, '84, and U. of W. Law, '87. In 1890 he became associated with Charles Buehner and W. S. Buckley to develop the mineral resources of the Buckley estate.

Henry G. Mitchell, vice president of the Mitchell-Lewis Motor Co., of Racine, Wis., died unexpectedly on May 31, of heart disease. Mr. Mitchell was born in Kenosha, Wis., on March 26, 1848, and went to Racine as a boy with his father, Henry Mitchell, founder of the Mitchell Wagon Works. He was superintendent and vice president of these works until the consolidation with the Mitchell Motor Car Co. and other interests of the Mitchell and Lewis families, of Racine, as the Mitchell-Lewis Motor Co. Mr. Mitchell was active in the directorate of the big corporation until the time of his death.

It is announced that owing to the recent important developments, it has been deemed wise to postpone the holding of the annual convention of the Engineers' Society of Pennsylvania at State College, Pa., from June 7, 8, 9 and 10, until a date to be set later in October.

Operating Features of a Large Machine Shop

Description of the Extensions to the C. W. Raymond Co.'s Clay Machinery Plant Which Include a Foundry and Machine Shop

The C. W. Raymond Co., Dayton, O., recently completed a new foundry and machine shop for the manufacture of clay working machinery. The new buildings are located on Bohlander avenue, at the crossing of the C., H. & D. railroad. A double spur track from the main line of this road serves the foundry and pig iron storage yards and extends into the machine shop, terminating in a depressed track for loading cars from the floor of the machine ship.

The two main buildings, the machine shop and the foundry, are built of steel frame construction with brick walls and galvanized metallic sash windows fitted with ribbed wire glass panes. The roofing is red tile, which, combined with variegated brown brick walls, produces a harmonious mottled effect and an architectural beauty not generally found in manufacturing plants.

The plant is located on a tract of eight acres. Work was started on the two buildings in March, 1910, and actual occupancy was first begun the following November. The machine shop is 325 feet long, 95 feet wide and 52 feet high. The foundry is 125 feet long and 107 feet wide. Power for both buildings, as well as the car and pattern shops, is obtained from the Dayton Light & Power Co., through a central transformer station. It is received at the transformer house at 2,300 volts alternating current and is stepped down to 110 volts for lighting and 220 volts for power.

The machine shop is divided into two side bays, 25 feet wide, and a main bay, 58 feet wide. Thirty-four I-beam columns support the roof of the main bay, which is steel trussed and roofed with red tile. Three distinct sources of light insure an even distribution over the entire lower floor and galleries. Windows are placed under the roof trusses in the galleries and on the ground floor. An industrial railway track extends the entire length of the main bay. A branch from the foundry leading to the elevator connecting with the galleries crosses the main track near the center of the foundry. The galleries are continuous around the building. At the back end of the machine shop a depressed railroad track for loading is accessible either to the crane or floor track.

On both sides facing the center aisle of the main bay are located the heavy machine tools. Underneath the galleries are the lighter tools, with the testing department at the rear, while the shop office is located underneath the gallery at the street entrance. The drafting room, pattern shop and pattern storage are located in the galleries. The lighter work, including the manufacture of trucks and dump cars, is handled in the galleries.

The machine shop presents a number of interesting features to insure economy in handling work and for taking care of deliveries. The machine tools are arranged in five equalized groups, each of which is driven by a 10-horsepower motor. This provides considerable flexibility of power and in case a motor driving tools that are working on a rush order, is out of commission it can be quickly replaced with a motor from a group that can remain idle until repairs are made. This insures the continuous operation on the particular work in hand without serious interference. To further guard against breakdown, one 10-horsepower motor is carried in stock. A 50-horsepower motor provides the power for the kiln and testing departments. The various groups of 10-horsepower units follow: Diemaking department; engine lathes, milling machines and grinders; planers, millers and keyseaters; drills and automatic screw machines; tool room, stock room

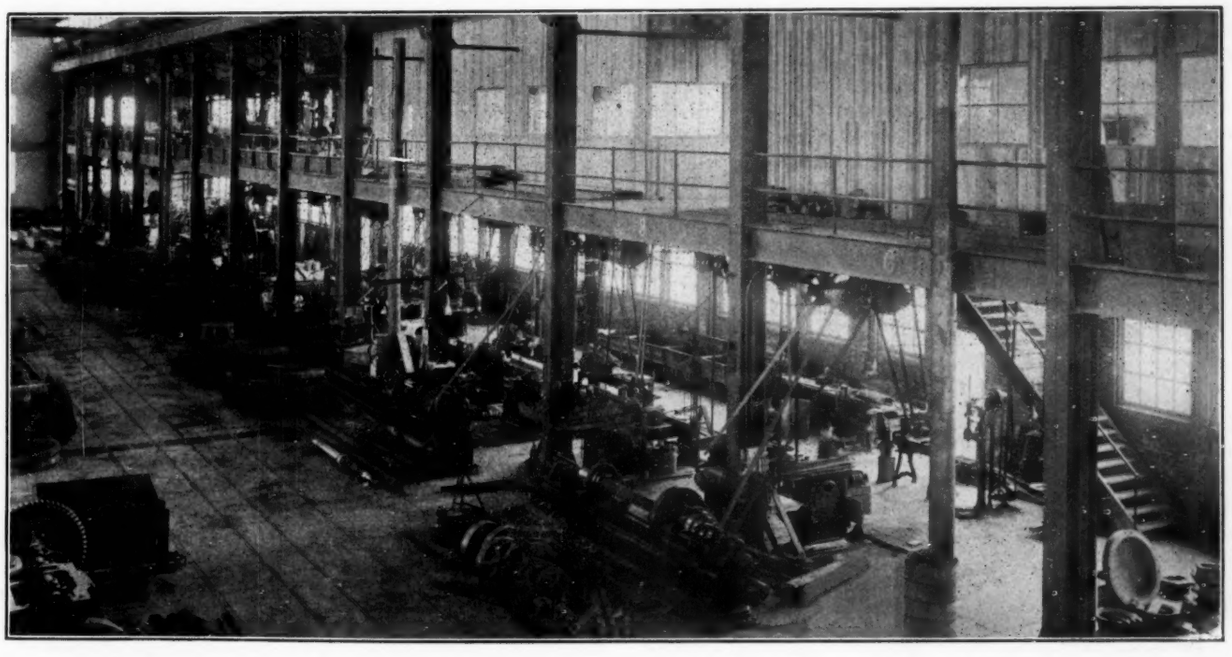


FIG. 1—A SECTION OF THE MAIN FLOOR OF THE MACHINE SHOP, SHOWING THE METHOD OF ARRANGING THE TOOLS TO PROVIDE WIDE AISLES IN BOTH BAYS

FIG. 2—A BORING MILL SET INTO THE FLOOR; THE TABLE IS ONLY 18 INCHES ABOVE THE FLOOR LEVEL

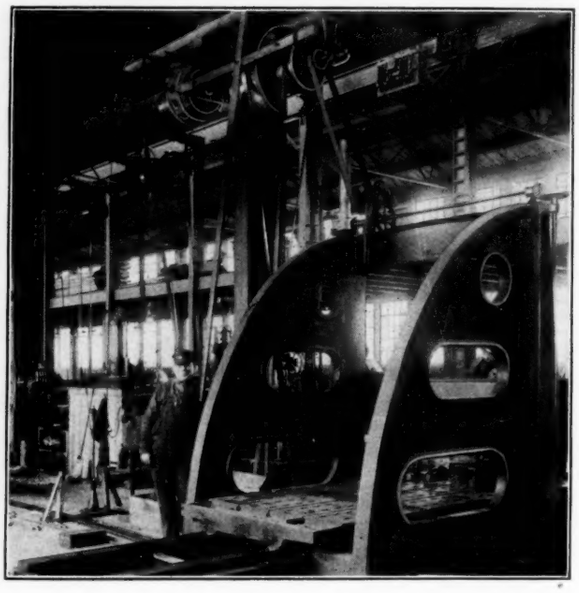


FIG. 3—ONE OF THE 10-HORSEPOWER MOTORS SUSPENDED FROM THE GALLERY BEAMS

and elevators. All the 10-horsepower motors are suspended from the gallery beams at the edge of the gallery facing the main bay, and are belted back to a jack shaft at the side of the wall, from which the various tools are driven by belts. In the testing department, Fig. 5, is shown the method of suspending the 40-horsepower motor. The motor platform is supported by rods from the gallery girders and side braced by rods attached at intervals to the floor beams.

In Fig. 2 is shown a standard Niles boring mill adapted to the particular needs of this shop for handling heavy work that cannot be raised conveniently high above the floor. The mill is depressed below the floor level so that the table is only 18 inches above the floor level.

The machinists' benches are portable and can be conveyed to the work, thereby avoiding unnecessary walking on the part of the machinist. The bench is supported by two iron legs of special design, set about 6 inches apart, and two boards attached lengthwise to the feet of the bench form a skid on which the bench can be moved around the shop. This bench is 8 feet long and is equipped with a bench vise and drawer and has a 5-inch back to prevent tools from falling off. A shelf, 20 inches from the floor, is provided for extra boxes, waste and material.

The lower floor of the machine shop is made of cement, and to solve the problem of how to dispose of electric wires with cement floors, heating pipes, etc., ducts have been let into the concrete floor along both outside walls and two transverse ducts across the shop. These ducts are 20 inches wide and 10 inches deep, and are covered with cast iron sewer gratings.

The foundry faces the south side of the machine shop and is connected with it by an industrial railway track. It is divided into a main, 40-foot bay for heavy work, and a side bay, 42 feet wide, for light work. A 10-ton Whiting three-motor electric crane, with a runway of 120 feet and a span of 40 feet, commands the main bay. No cranes are used in the side bay. The building is well lighted and the windows are high and well arranged to avoid shadows. The south side of the building contains the cleaning, melting and core departments. With the exception of the core room, this part of the foundry is partitioned off from the molding floors by brick walls, making it dust and dirt-

FIG. 4—A SECTION OF THE FOUNDRY, SHOWING THE ENCLOSED CUPOLA ROOM AND LARGE CORE OVEN

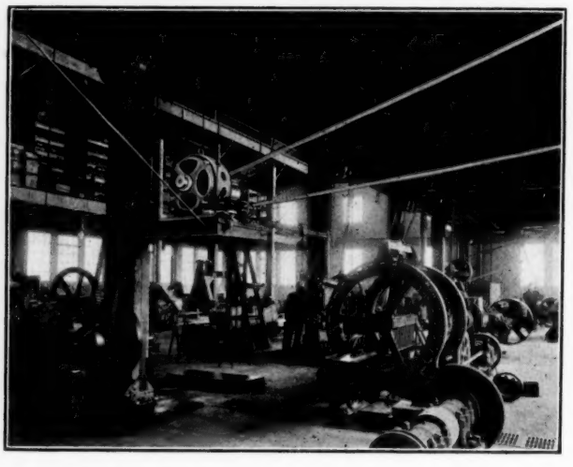


FIG. 5—METHOD OF SUSPENDING THE LARGE MOTOR IN THE TESTING DEPARTMENT

proof. The cleaning room is equipped with a sand blast, sprue cutters and tumbling barrels. A cement floor extends the entire length of the cleaning room and a branch of the shop industrial railway system provides communication with all parts of the plant. The charging floor is 26 feet square and is designed to accommodate another 56-inch Whiting cupola when the foundry is extended. The blowers are located underneath the charging floor. The core oven is 10 x 16 feet and has a 6-foot track for core oven cars.

Pig iron and coke for the foundry are conveyed from the storage yard over an industrial track to the elevator serving the charging floor. The cupola is provided with two charging doors to facilitate rapid charging. Castings are delivered over the industrial track to the machine shop or to the loading station, as may be required. All parts of the foundry are protected by sliding fire doors. Flasks are stored back of the foundry at the side of the industrial tracks. The foundry was built by and is under the supervision of W. M. Scott, formerly with the P. Hayden Saddlery Co., Columbus, O.

What is Accurate Definition of Machine Tool[1]

Painstaking Endeavor to Establish Practical Working Explanation for Technical Term

As a healthy mental exercise, and a pleasant change from chess and other similar amusements, try defining the above subject. It will prove instructive. One learns so much more about the subject he wishes to discuss, if he will only stop just long enough to write it down clearly. After having satisfied himself as to its correctness, to proceed to submit it to another and have him feel equally as satisfied with the result or conclusions first obtained, will be found an entirely different problem.

Five years ago, at our New York meeting, one of our members proposed the name of a chuck manufacturer for membership in our association. Immediately diverse views were expressed as to his eligibility in view of his line of manufacture, and quite a diversion of opinion prevailed over the subject. By referring to our constitution we found all those who were engaged in the manufacture of machine tools are eligible. The question then arose—"What is a machine tool?" Various comments have since been received with more or less degree of amusement. It is a subject, however, which, if rightly treated, should prove of advantage and credit to our association.

Since our association has been seriously considering the term, writers from across the Atlantic, as well as those from this side, have expressed their views in some of our leading mechanical papers. Your chairman, after a certain amount of work, received from our secretary a follow-up letter, urging as to the possibility of making a report on the subject for this meeting and expressing some of his own views. His remarks were very opportune and decidedly refreshing, and he was immediately pressed into service, and admitted "at sight" into the innermost secrets. As a result we have the coining of a new term; we are told that we have been following a false god, and that in place of "machine tools" we really have been making "tool machines." Our secretary has given us a very good view on the subject from this angle, in a paper written to *The American Machinist*, issue of May 11, page 895.

If you ask the reason for the discussion of the subject, we would state:—

First. The dignity of our profession deserves it as a guide to define our industry intelligently.

Second. Our government can make use of the same in the customs department, bureau of the census, and bureau of statistics, all of which will in time benefit our industry by reason of more completely kept records, etc.

Information Sought.

Your committee has collected a quantity of information from leading individuals and concerns in this country, expressing their views, together with searching such works of reference as Lockwood's Dictionary of Mechanical Engineering Terms, Century Dictionary, Webster's New International Dictionary, Standard Dictionary, Knight's Mechanical Dictionary, and Worcester's Dictionary, as to the definition of a "tool machine" and "machine tool."

It is true of almost any question, that one obtains a view depending largely upon the angle from which one approaches the subject. If we analyze the term from a grammatical standpoint, the question arises as to whether "tool" should be considered as a noun and "machine" as the adjective or consider the words hyphenated, as some authorities treat it, as "machine-tool," and you have a compound noun. The mind can, without much apparent effort, find good reasons for both interpretations, and in the end it is a question whether or not the entire subject is not one which can be only solved by the rule of interpretation called habit or custom. A definition of the former, found in the Standard Dictionary, is: "A tendency of inclination toward an action or condition, which by repetition has become easy, spontaneous, or even unconscious." And, of the latter: "An ordinary or usual manner of doing or acting, whether of a person or a body of persons."

Machine-tool *by habit* rightly is a compound noun, and grammatically should be hyphenated; but through habit again, apparently, the hyphen has been dropped, but the sense and inference have remained. You cannot make water run up hill, and we would not wish to undertake the impossible. Neither should we try the experiment of the "new spelling idea," the fate of which we all know, notwithstanding it has an able champion and advocate. But if some plan were sufficiently satisfactory for a body like our association to approve of and adopt, it would, we believe, be recognized with authority, and be observed throughout the country.

As against the argument of the "tool machine" theory, we would cite the present day practice of referring to the tools, such as the hammer, chisel, etc., as "hand tools" and of the twist drill, reamer, tap, etc., as "small tools." (See Brown & Sharpe's and Pratt & Whitney's latest catalogs.) In view of the above reasoning, it would not be illogical to define a "machine tool" as a machine to actuate mechanically a tool and work piece rel-

[1]Report of committee read by Fred L. Eberhardt before convention of National Machine Tool Builders' Association, May 18 and 19.

ative to each other, to alter, shape or change the condition of said work piece; or, a machine adapted to actuate mechanically either the tool, the material to be operated upon by the tool, or both, in such relation to each other, as to alter the shape of the material or the condition of the same, the last phrase referring to such machines as the arbor press and electric welding machines.

The entire subject could be classified as machinery.

METAL CUTTING MACHINES	Turning machines Drilling machines Planing machines Milling machines Grinding machines Shearing machines Punching machines	CHIP PRODUCING
	Vertical and Horizontal Shapers, Broachers, Slotters Vertical and Horizontal Polishing	

First, as to foreign terms for machine tool. Tolhausen's Technological Dictionary gives machine-outil as French for a machine tool. It also gives outil-machine for the same thing. In German, as Mr. Hildreth says, the word tool comes first. The fact that the dictionary gives both forms in the French indicates that the French use the word both ways, with tool first and with machine first. In general I think it safe that the meaning of a word is determined by general use, and by nothing else. This is particularly true of words used by a specific trade; the meaning ascribed to words peculiar to a certain trade by persons engaged in that trade, is the meaning which would be upheld in any court of law or by any group of philologists. If this be true, then the word machine tool without the hyphen (considered as a compound word with the hyphen omitted) is the word which most properly today describes the things made by the members of your association.

Is not here an excellent opportunity for action on the part of your association? The procedure indicated would seem to be something like this: Make a series of definitions of such a list of terms used in your trade as seems advisable; retain as far as possible all words and meanings now sanctioned by general use; having agreed on the definitions of this set of terms and secured the general approval of those definitions by machine tool builders in this country, then endeavor to extend their adoption to all English-speaking countries, further extend their adoption by co-operation with machine tool builders in foreign countries and finally, forming a small dictionary in three, four or half a dozen languages, after the style of Tolhausen, with definitions so precise, and with words of the same descriptive value in the several languages, so carefully set forth, that no mistakes can be made.

Tool as defined by Knight's American Dictionary, 1876, is an implement adapted to be used by one person, and depending for its effect upon the strength and skill of the operator;" or, as defined by Webster, "any instrument of manual operation." It is, however, exceedingly difficult to define the line separating tools from machines, and of late it has become usual to embrace in the general term machine tools, such machines as the lathe, planer, slotting machines and others employed in the manufacture of machinery. The Oxford English Dictionary says: "Machine tool, a machine for cutting or shaping wood, metals, etc., by means of a tool, especially one designed for use in a machine shop." In 1861 the word was used with the above meaning before the British association.

Metal forming machines Wood Working Machines Paper Working Machines Thread and Cloth Working Machines Fibre Working Machines Clay and Stone Working Machines		
	Spinning Machines Rolling Machines Pressing Machines	NON CHIP-PRODUCING
	Welding Machines	

This line of analysis would be similar to the government practice, for instance, in the department of commerce and labor, under which head the following distinct department heads will be found, each presided over by a separate chief:

Bureau of the Census.
Bureau of Immigration and Naturalization.
Bureau of Manufactures.
Bureau of Standards.
Bureau of Corporations.
Bureau of Labor.
Bureau of Statistics.
Bureau of Fisheries.
Bureau of Navigation.

MAIN ENTRANCE TO GARY PLANT SHOWING ILLUMINATED SIGN

Accident Prevention at Gary

At the main entrance to the steel plant at Gary, Ind., the Indiana Steel Co. has recently erected a sign, illustrated herewith, which reads: "Careful men are usually efficient, careless men are not." It was installed by the safety department and at night it is brilliantly illuminated by electricity. By day or night it carries its message to everyone who enters the plant, suggesting that the men who are careful, taking pains to avoid accidents and injury, either to themselves or others, are usually the most efficient and the kind the company wishes to keep on its pay roll. It reminds everyone at the very entrance to the works that safety is the first consideration.

The Gary plant is said to have more safeguards against accidents than any plant in the country, and it is the aim of the officials to have the lowest accident record of any works connected with the Steel Corporation. To succeed in this effort all the employes in the plant must co-operate and the sign at the entrance is only a small part of the efforts which are made by the safety department to secure co-operation to prevent accidents. The sign is 10 feet long and 30 inches high and may be easily read at a distance of 50 feet.

Arrangement and Construction of the Foundry[1]

Factors to be Considered When Laying Out a Plant for the Economical Production of Castings

By G. H. Hooper

In the construction of foundries of such tonnages that handling methods must be carefully considered, the most important points to be determined, primarily, by the engineers are the characteristics as to weights, shapes, sizes, etc., of the product to be manufactured, the facilities for receiving and storing the raw materials, the shipping of the finished product and the routing of the various materials and processes required in its manufacture.

The location of an industry is usually determined by one or more important factors over which the engineer may have no control, but which must be thoroughly analyzed by him, as these introduce conditions which should be anticipated early to avoid serious complications when the planning of the equipment and structure are undertaken.

Railroad or dock service, or both rail and water facilities, are, of course, an absolute necessity to the modern manufacturer and the routing of the product with reference to the location of these or the building of additional sidings or spurs to fit plant operating conditions, must be carefully planned.

Arrangement of the Foundry.

After these preliminaries have been duly considered and digested, a definite plan of campaign may be mapped out to include such items as the locations of cupolas or furnaces with relation to the cheapest and most convenient method of handling iron, coke or coal for charging and the facilities for taking away the molten metal for pouring and the removal of the attendant refuse and waste. The layout of the molders' benches or machines should be considered with relation to the receiving of molding sand and location of pouring floors, which should in turn be contiguous to the cupolas.

The selection of a section to be devoted to the making, baking and storing of cores must also be assigned, which should be convenient to the molders, as the transporting of this more or less fragile material is a hand labor item which we have not yet been able to very successfully supersede by mechanical methods.

If the foundry has a malleable department, the location of annealing ovens must be selected to minimize the distance of handling between them and the hard and soft cleaning mills, while the storage of packing and the filling and dumping of pots must be arranged to give the greatest service with the least amount of handling.

System for Handling Materials.

Another important item is the early selection of a system for the handling of miscellaneous materials. It will probably develop that some one of the well-known systems, such as hand-operated industrial cars, storage battery or steam locomotive industrial systems or mono-rail transportation systems will be chosen. Generally speaking, I am of the opinion that the overhead mono-rail system, which, in combination with transfer cranes for covering specified areas, makes a remarkably flexible arrangement.

Although it has been pointed out that a crane aisle equal in width to the space occupied by industrial systems, must be reserved for the operation of mono-rail systems, it is possible to utilize this space for hand trucking—and a certain amount of hand-trucking and wheelbarrow work is unavoidable in any plant—without interfering with the operation of the traveler. Then, also, the storage space for castings at cleaning mills and chipping and sorting benches, sprue cutters, grinders, etc., may be placed most conveniently to the operators engaged in this work, still allowing the traveler to serve operators beyond these zones without interference.

One factor, decidedly favorable to the overhead system, is that a plant may be laid out at several different grades to take advantage of material storage facilities, or to avoid expensive cuts and fills, the track level remaining uniform and the difference made up in the length of the cables and the size of the winding drums. The final determination of the selection of this system is dependent, however, upon other factors of more or less importance, on the size and shape of the plant, the distance between points and the area of the zones over which the material must be transported, and the variety of services to which it can be applied.

Following the selection of the general handling scheme, the individual handling methods may be considered, and, whether they are for molding sand handling and tempering, scale handling and storing or core conveying, each must be given close study and careful consideration as to the amount of floor space it is to occupy and the elevations of its various levels.

The number, size and characteristics of the cleaning mills and their attendant exhaust systems is a feature which may require some analysis before their location may be assigned, as will also the space required for the storage of flasks, bottom boards, spare parts, etc., and the lining and drying of ladles.

Should apparatus be installed for the reclaiming of iron from furnace slag and foundry waste, a space must be set apart for the storage of the slag and the disposal of the refuse resulting from this process. If a department for the generation of electric power is required, the site may be selected by the usual rules applicable to industrial power plants. These rules hold good up to the selection of the current characteristics, which should, for foundry work, be alternating, as the machinery operated in a foundry is almost invariably located in a dusty and sometimes inaccessible location. Heavy motors of the induction type should be used, as these are less susceptible to abuse and neglect than other types.

Electric Power for Cranes.

Current for operating cranes, which, for the nice control required for pouring small molds from large ladles should be direct, may be obtained by providing an exciter of sufficient size to supply the required amount of current, if current is being generated locally, or from a motor generator set, if current is being purchased from a central station company.

The incorporation of these zones into the general scheme must be such as to give the greatest economic bearing, one on the other, relative to a direct and systematic routing of the product.

The outline gives, in a general way, a working basis, but even this must be flexible enough to vary somewhat as the detail design progresses, although when the selection of a scheme has once been decided upon by careful consideration of each factor independently and collectively, no radical departure should be entertained, as this leads to the destruction of the entire layout.

Careful consideration in the selection and assignment of these various proc-

[1]Presented at the Pittsburg convention of the American Foundrymen's Association.

esses and the apparatus required by them are imperative in a foundry, as casting production is one of the least flexible of the manufacturing operations, particularly if it be of the high-grade malleable type with large furnaces and ovens set on massive foundations and provided with self-supporting stacks a hundred or more feet in height.

Design of the Buildings.

Thorough preliminary work also tends to cheapen the cost of the buildings, as after the apparatus has been located, short roof spans may be adopted in certain cases when building columns can be placed so as not to interfere with the equipment or operations. Conversely, large spans and heavy trusses may be used to avoid placing building columns in such positions as might increase the cost of the equipment and interfere with production. Although, at times, this adds materially to the cost of the building structure, it is chargeable only to the amortization account, while a row of columns, which interfere with the handling of materials or which sever the continuity of the product, would set up and maintain a perpetual charge against the cost of production.

Portions of the building over some types of apparatus, such as conveyors and high bucket elevators, for instance, can be specially treated, leaving the rest of the building more or less standard, where, if the designing of the building is allowed to proceed regardless of special equipment problems, a large part of the building may have to be treated expensively so as not to interfere with the special apparatus when these are finally decided upon.

Although I have not attempted to give a detailed description of the machinery usually installed in a mechanical foundry, I think I have outlined enough to show that its application makes necessary, extensive and fundamental changes in the type of building required for housing this industry.

Height of Foundry Buildings.

In place of the single-story building with crane or cranes carried on columns or on side walls, with a light steel or wooden truss sufficient only to carry a roof of comparatively light construction, we have a building of heavy and modern steel design, capable of sustaining machinery loads of considerable weight, and of absorbing the vibratory stresses and shocks imposed by this equipment. In cases where the product can be routed more economically by the adoption of multi-storied buildings, foundries of two or more stories are becoming common.

This type of construction is also being adopted where land values are high and in cases where extensions are necessary to existing plants that are cramped for ground room. Although the adoption of modern construction entails a considerable amount of study and preparation, and adds somewhat to the cost of construction, this has been proven to be fully compensated for by the results obtained.

Preferably, in my experience, the structure takes the form of a steel skeleton with curtain walls and masonry pilasters, concrete floors, metal sash windows in some cases, heavy steel trusses supporting a roof of one of the acceptable forms of concrete tile now available.

For finishing and shipping departments on the ground floor of foundry buildings, a tar-concrete base carrying a Georgia pine rough floor with a finish floor of factory maple or beech, has given satisfaction, while concrete floors present a good working surface for most operations. In some cases, however, it becomes necessary to select special flooring to meet severe conditions.

Foundry Floors.

For malleable foundries using mechanical charging trucks, operated either by steam or compressed air, a flooring material embodying a wearing surface sufficiently tough to withstand the tractive effect of the driving wheels, as well as the necessary strength to carry the heavy loads transported by these machines, is required. The hardest material succumbs rapidly to the slip of the driving wheels and where steel plates have been used to protect the finished surface of the concrete, they have been found to buckle badly.

Wooden paving blocks seem to offer, so far, the only solution, and these, I can say from my own experience, make a very satisfactory flooring for this service. The expensive creosoted block, such as is used for street paving, is not required in foundry work, however, as a much cheaper type of block can be used which gives equally as good results. This floor can be laid up to within a couple of feet of the oven fronts, a good quality of vitrified paving brick being used to bridge the space between the refractory floor of the ovens and the block floor outside. For a one-story building, devoted to floor molding, no floor other than the suitable sand floor with pits is necessary.

The building walls are preferably of brick and the columns supporting craneway and roof trusses should be built and well fitted into the masonry to save the expense of repainting. The roof trusses, and this should apply to all forms of buildings, whether single or multi-storied, should be constructed with heavy, single web members to facilitate cleaning and painting; and the construction of these trusses should be such that all parts can be reached easily for these purposes.

The purlins require considerable care in aligning them to support the tile roofing, but this can be done quite easily with sag rods, even when the purlins cover spans up to 18 feet. Several excellent types of cement tile roof are now on the market and these have some decided advantages over most other roofing materials for foundry purposes. The principal reasons for adopting this roof for industrial purposes are that it combines strength and lightness and that it is practically indestructible from natural causes, thereby tending to make the cost of maintenance exceptionally low.

Foundry Roofing.

A novelty embodied in this form of roofing is the glass inset tile, which appeals strongly to the foundry manager or engineer. It being a well-known fact that the molding department is particularly hard to illuminate artificially, owing to the natural tendency of the dead black surface of the molding sand to absorb the light rays, the use of the glass inset tile makes possible natural, overhead lighting, which extends the daylight period considerably without the use of monitors or heavy metal frame skylights, both of which embody some very disagreeable features. As it has been proven by the practice of other engineers as well as myself, that the inset tile is a more efficient lighting medium than the side-lighted monitor, we may as well dispense with this awkward and inartistic structure entirely and substitute for its ventilating features the hooded copper ventilator, several makes of which are so constructed as to induce a draft when a slight breeze is blowing from any direction.

Before the design of the steel work can be submitted to the contractor for estimates, the location of the machinery carried by the steel work must be decided on and the weights, shocks, etc., determined. It is usually found that certain portions of the steel structure will be free from special loading and these can be ordered and fabricated while the special work is being designed. As soon as these features are determined, the contractor for the foundation work can be notified to complete this part of the work first, thus keeping ahead of the steel workers, who, in time, make way for the bricklayers or the concrete form builders.

As soon as the steel work is completed in the special sections, the active work of erecting the conveying and other machinery may be started, orders having been placed for the purchase of

this equipment while the design of the building and steel work was going on, the general contractor having, in the meantime, been supplied with information for the location and building of the machinery foundations, trenches, special floors, etc. The roofing to be applied as fast as the trusses and purlins are placed and riveted.

Heating the Foundry.

When a foundry plant is under one roof and covers a considerable area, the method of heating becomes a good deal of a problem, as certain zones must be heated to obtain the best results in the cleaning and sorting rooms when these departments are located at some distance from sources of waste heat, such as cupolas, ovens, etc. Some heat is also necessary at night to avoid freezing between the hours when the castings have been shaken out and cooled and before the fires are started in the morning. In buildings not over 50 feet wide, direct radiation placed on the outside walls should be adopted, but in the wide buildings covering a large area it is obvious that this system cannot be used. For positively supplying heat to certain stipulated portions of a building of this type, the hot blast heating system seems to give the desired results so far as the actual raising of the temperature is concerned.

I have touched lightly on the subject of illumination under the head of roofing and monitors. For general illumination of pouring floors, rough and finished storage and shipping departments, I have had very good success with the mercury arc lamp, although, in some cases, the 70 or 100-hour flaming arc has given better results. The field of usefulness of the 16-candlepower incandescent lamp is, however, but slightly encroached upon by the large unit lamp in foundry practice, as I have found it necessary to provide for each molder, and over each unit of machinery, as well as at all benches, at least one small unit lamp in addition to furnishing a row of incandescent lamps spaced at proper intervals along the lines of conveyors. The liberal use of plug receptacles placed handy to all machines and all trenches and inaccessible places, is strongly advised, so that portable lamps may be attached by extension cords for the examination of and repairs to apparatus.

Artificial Illumination.

Although there is a large and increasing demand for the tungsten and metallized filament lamp, I am not yet convinced that these lamps are sufficiently rugged to withstand the treatment which lamps in a foundry receive. The excessive breakage of the entire lamp in some cases, and the destruction of the filament in others, coupled with the high first cost of these units, far exceeds the saving obtained by the lower current consumption of the high efficiency lamps.

Under the head of plumbing are included the questions of water supply, toilets, wash rooms, drinking fountains, etc., and in this connection the problem of sewage disposal must be treated. The subject of providing toilets for the rank and file of foundry employes is one of the most vexing problems for the engineer to solve. Although I think these men do not maliciously smash doors and closet seats and rip chain pulls from their fastenings, they apparently become, through the labor that they are called upon to perform, what might be described for the want of a better term to describe their subconscious movements, *heavy - handed*, which condition acts disastrously on even the heaviest plumbing fixtures known to the trade. The lifting closet seat is, of course, a decidedly unsanitary adjunct to the toilet room and the heavy, roll-rim, seatless closet is far more desirable from this point of view. The seat, however, has its advantage in that it can be used to operate the water for flushing the closet.

Plumbing.

One of the most successful ways of solving all of the toilet room problems consists in detailing an employe to see that the closets are kept flushed and cleaned and that no loafing takes place around them. This method has its drawbacks in foundries covering a large area, however, as it is necessary, in this case, to scatter the toilets and divide them into small units so that the men cannot have any excuse for straying away from the work on which they are engaged, as would be the case where one central location for toilets is provided. I am fully convinced, in view of these facts, that if toilets are to be provided for the more ignorant class of labor, they must be kept under the constant surveillance of some responsible employe or they become a continual source of expense and dissatisfaction.

The water supply for a foundry should be selected after considering the following factors:

Cost and quantity guaranteed by municipal or private water companies.

Availability of natural supplies.

Cost of utilizing this supply.

Quantity and quality obtained from natural sources.

Decision on this point is necessary before the water supply system can be laid out, which includes piping, pumps, tanks, tower, hydrants, hose houses, etc.

After some experimenting with fancy fixtures, and a great deal of consideration based on the opinion of foundry superintendents and my own observation, I have concluded that a plain, copper-lined wash sink, provided with hand basins clained in place and supplied with hot and cold water, is the best method for washing, both from a cost and sanitary standpoint. Shower baths seem to meet with an equal amount of favor and disfavor by the foundry managers. Personally, I am in favor of installing them, as they not only increase the efficiency of the men in warm weather, but they also increase the self-respect of the men who use them.

Pattern Shop.

The departments that it is advisable to detach from the main buildings are the pattern shop, the equipment machine shop, the structure covering the oil storage tanks, if these are used, and if power is being purchased, a building housing the high-tension switching apparatus and transformers. By making the pattern shop an independent structure, we are able to erect a building having light on all four sides and of a width which insures light at the machines, the best practice being to place these between the center aisle and the benches, which are, of course, located adjacent to the windows. The pattern stock room may be located either above or below the manufacturing floor. If above, the lumber may be raised by a plain hoist, large doors opening down to the floor being provided.

A very good arrangement is obtained by the combination of the equipment machine shop and the pattern shop under one roof. The building may then be of the multi-storied type, devoting the basement to the storage of heavy equipment materials such as sprockets, heavy chains, pulleys, shafting hangers, motors, etc.

Repair Department.

The first or ground floor is, in this case, the logical location for the equipment machine shop, which contains such machine tools as are necessary in the manufacture of flasks, metal patterns, core boxes, etc., consisting of lathes, planers, shapers, saws, drills of various kinds and such other tools as may be required to meet the demands of the foundry. Space should be allotted in this department for a complete repair shop and the headquarters of the various repair gangs. These are usually divided into millwrights, steam fitters and plumbers, and electricians. Each of these gangs should be assigned sufficient space for benches and lockers and the storage of chain blocks, rope-falls, etc.

An erecting space should be reserved on this floor for the setting-up and

repairing of large machines, charging trucks, etc., which are more conveniently repaired in the machine shop than in the works.

Frequently, not enough attention is given to the repair departments at the inception of an industry, although the maintenance of a plant is given prominent recognition in the estimated production costs. A properly equipped and organized maintenance force can be made to show savings where production departments show earnings, and just as much care should be expended in the incorporation of this department in the general scheme, as that of the molding floors or the power house.

Assuming that the basement and first floors of the combination building are occupied by the equipment machine departments, the pattern manufacturing department should be assigned to the second floor and as many floors added above this as are required for the storage of patterns, pattern stock, etc. This building should be of fireproof construction throughout and should meet all underwriters' requirements as to automatic doors, sash, etc. The floors should be connected by an isolated fireproof stair case served by a platform freight elevator.

In conclusion I would like to add that I have endeavored to emphasize the fact that the construction of a foundry, as is the case with all industrial plants, begins with the selection of the site and every factor embodied in this decision has a certain definite and important bearing on the physical planning of the industry. The actual design and construction of the buildings are entirely controlled by this and the modifying conditions introduced by the commodity manufactured.

Welding Blow-Holes and Cavities in Ingots[1]

How Blow-Hole Cavities in Steel are Developed and How Piping in Ingots is Prevented—Welding Experiments

By J. E. Stead

In the general terms, *welding* may be described as the crystallizing into union of two solid metallic surfaces when they are brought together under suitable conditions. That such is the case is proved by microscopic examination, for on polishing and etching sections of the united metals, the crystals along the junction are found to be common to each of the original pieces of metal.

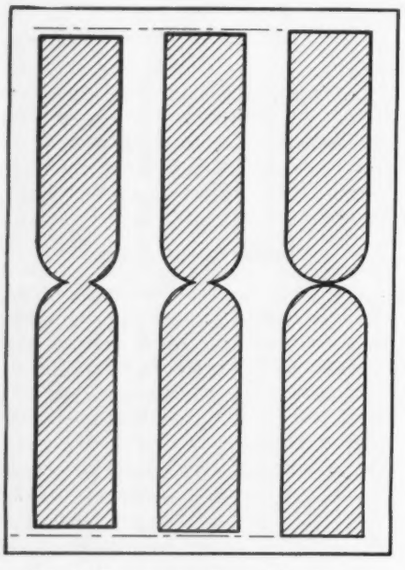


FIG. 1—PRISMS OF STEEL WELDED BY CONTACT

In perfect welding there is no visible joint, for the line or plane of junction is occupied by crystals, portions of which belong to one piece of metal and portions of the same crystals to the other. When the boundary of the crystals are coincident with the juxtaposed plane surfaces, it is evidence of non-welding, which is equivalent to saying that unless the crystals become common to the two pieces, there is no welding.

The following conditions are necessary for the welding of two metallic surfaces of iron and steel:

1.—The surfaces must be clean and free from any foreign infusible substance, such as oxide of iron, slag, lime, etc.

2.—The metallic surfaces must be in actual contact.

3.—Given the conditions in Nos. 1 and 2, the higher the temperature the more rapid is the crystallization or welding together of the surfaces placed in juxtaposition; indeed, one often notices when a blacksmith allows two pieces of highly heated steel or iron to simply rest on one another, welding at the points of contact is instantaneous. The subsequent hammering brings the whole of the surfaces in contact and incidentally squeezes out the liquid, intervening slag.

It is well known that iron and steel will crystallize, or weld together, at temperatures far below the so-called welding point, as has been proved by Coffin and others, but so far as we know, systematic trials have not been made with steels of varying and given composition with the object of determining at what temperatures they will actually unite. The experiments which follow were made as a preliminary essay in this direction. The steels selected contained between 0.1 and 1.40 per cent carbon.

In this series, small sections of three different steels in duplicate, containing 0.1, 0.5, and 1.4 per cent of carbon, having the dimensions of 10 x 10 x 5 millimeters, were ground down on one of their sides to plane surfaces, polished and placed face to face in a porcelain tube, and were heated in an atmosphere of hydrogen gas for two hours at a temperature of 900 degrees Cent. After cooling, the steels were removed and examined; in each case the surfaces had crystallized together so firmly that they could not be easily separated. By using a chisel and hammer they were broken. On examining the pieces it was seen that the metals had crystallized together at a few isolated points, for the surfaces at these positions had a crystalline fracture. All of the samples with 1.4, 0.5 and 0.1 per cent of carbon appeared to be equally welded. In duplicate experiments the welded specimens were sectioned through the two pieces and the surfaces polished and etched. In each case along the junction, in certain spots, the crystals were common to each piece, that is to say, they were continuous from one piece into the other. On heating corresponding pieces to a temperature of 800 degrees Cent. for two hours, they welded together at some points,

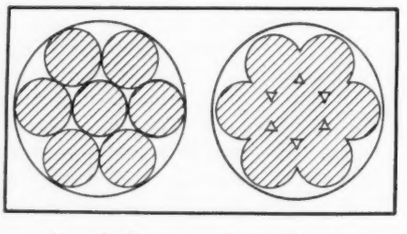


FIG. 2—BUNDLED BARS WELDED TOGETHER

[1]Presented at the meeting of the Iron and Steel Institute.

but the areas welded were not quite so great as in the pieces heated at 900 degrees Cent.

The reason for the welding only having occurred at certain spots is attributed to the inequality of the surfaces placed together, and that the second condition necessary for perfect welding was absent. There is little doubt that the welding would have been perfect had the surfaces been true planes, or had sufficient pressure been applied during the heating period to bring the whole area of the faces into actual contact.

Second Experiment.

The experiment, described, was repeated, but under slightly different conditions, for instead of flat pieces, short prisms, cut in duplicate, from bars of steel were substituted. They were shaped in a lathe, so as to leave one end of each semi-spherical and the other end flat.

In each experiment the rounded ends of the duplicate pieces were placed so as to touch one another, and were put into a porcelain tube, and kept in contact by gentle pressure. After heating for two hours in hydrogen gas, to a temperature of 800 degrees Cent., the pieces in each class of steel were found to be welded at the points of contact. When broken, the fractures at the joints were found to be crystalline, and measured about 0.5 millimeter across. In these trials where the metals were in physical contact, crystallization or welding was complete and perfect.

It is well known that piled sheets of relatively pure steel, when rolled at

FIG. 3—FRACTURE OF A HONEYCOMBED INGOT

temperatures certainly below 900 degrees Cent., not infrequently stick together at certain points where the steel is free from oxide, and require great force to separate them from each other, and in some cases separation cannot be effected without tearing the sheets. In an extreme case of such sticking, two sheets at the point where they adhered were sectioned, polished and etched, and were examined microscopically, when it was found that the crystals of one sheet passed into the other, evidence of true welding, and this was effected by heating and rolling at a temperature far below that at which welding is considered to be possible with such material.

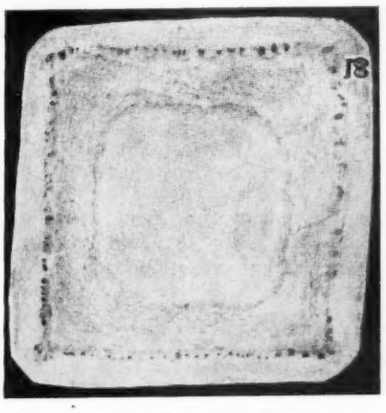


FIG. 4—INGOT, SHOWING BLOW-HOLE SEGREGATIONS

Further trials were made with the round-ended prisms of steel, to determine what would follow on heating them when in contact, at a temperature between 1,300 and 1,400 degrees Cent. For this purpose a complete series of pieces were placed, rounded ends in contact with each other, inside a wrought-iron tube, and this, after hermetically sealing, was put into a ladle containing about four tons of molten slag.

As it was found afterwards that the tube with contents was in an inclined position, it is possible the pieces of steel inside pressed against each other by gravity. The tube was allowed to remain in the slag till cold; the slag ball was broken up, and the tube removed. On examination, the two pieces of steel containing 1.4 per cent carbon were found to be porous, and that a liquid phase had liquated out and become fused onto the side of the tube. No liquation had taken place from the steels of lower carbon. All had become perfectly welded at the rounded ends, and the areas of junction or welding varied between 3 and 5 millimeters in diameter. Fig. 1 illustrates what had happened.

The distance between the flat ends of the welded pieces was slightly less than before heating, but the corners of the square or flat ends of the steel with under 1 per cent carbon were not altered, and remained square and sharp, a proof that they had not approached the melting point, otherwise they would have become rounded by the influence of surface tension.

In another trial a bundle of seven round steel bars, ½ inch in diameter, tied together with wire, was dropped into a ladle of molten slag and was allowed to cool with the slag. It was found that the steel, when cold, had become welded at the points of contact, and had coalesced, or been drawn together to a considerable degree, a phenomenon suggesting that had the heating been continued for a sufficient length of time, the bars would have coalesced to such an extent as to make one solid bar. That surface tension was not responsible for this peculiarity was proved by the fact that, in this as in the previous cases, the cut ends of the bars were not rounded in the least, and the most delicate stampings and scratches on the outside of the bars were not effaced.

Fifth Experiment.

In crucible steel works practice, it is sometimes the custom to heat the steel to, and forge from, what is called the wash-welding temperature, and it is assumed that if the material initially contains cavities or blow-holes, they will be welded together. In order to determine whether larger cavities than blow-holes could be so welded, a series of trials on a practical scale were made by F. M. Parkin, at the Don Steel Works, Sheffield, Eng., with the object of determining whether artificially formed pipes or cavities in steel could be welded by wash-welding and forging, and at what temperature this could be effected.

With this object square bars, 8 x 2 inches, of Swedish Bessemer steel con-

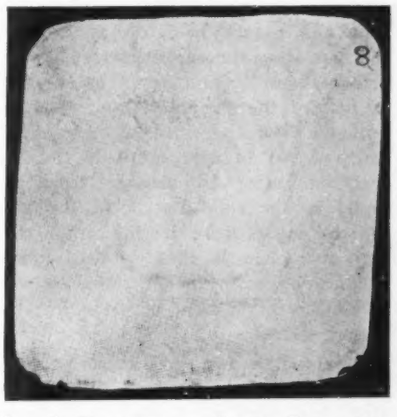


FIG. 5—FRACTURE OF INGOT CAST FROM SAME STEEL AS FIG. 4, BUT TO WHICH ALUMINUM WAS ADDED

taining 0.15 per cent carbon were drilled down one end of each to a depth of 7 inches, with a ½-inch drill, leaving a solid bottom of 1 inch. Taper plugs of the same material, 1½ inches in length, were also prepared. In order

to displace the air from the drill holes, a few drops of petrol were introduced, and afterwards the taper plugs of steel were driven forcibly into the open ends.

The closed and piped bars were heated to 800 degrees Cent., and after being removed from the fire were gently flattened under a hammer, so as to close up the cavities, after which they were heated respectively to 750, 950 and 1,150 degrees Cent. for 30 minutes, and were forged down at these temperatures into 1-inch square bars. When cold, they were broken and examined both by the eye and also by the microscope on cut and polished specimens and by bending cross sections cut across the central axes. In the piece heated at 750 degrees Cent., there was no evidence of welding. In the piece heated to 950 degrees Cent., welding had occurred at the lower end only, while the bar heated to 1,150 degrees Cent. was perfectly welded and sound from end to end. A second trial was made with a steel containing 1.40 per cent carbon. This was prepared, as described in the previous case, with an artificial pipe, and was heated to between 1,050 and 1,100 degrees Cent. It was forged in the manner described. After cooling it was found that, excepting near the upper plugged end, the welding had been satisfactory; there was no trace of unsoundness or hollowness.

How Blow-Hole Cavities are Developed.

Prof. Howe has given a very characteristic definition of the genesis of blow-holes. He says: "The blow-holes represent (a) the progressive concentration in the molten or liquid mother mass of the gases initially present, a concentration carried on to supersaturation, and to the liberation of part of this gas from the supersaturated layers; and perhaps (b) in some cases, such as that of the solidification of steel ingots, the formation of a gas from chemical reaction brought about by fall of temperature, or by passage from the liquid to the solid state. In the case of steel ingots there are indications that carbonic oxide is thus formed during solidfication by the union of oxygen and carbon present side by side in the molten metal."

It is well known, and, therefore, may be referred to briefly here, that if the steel has been in contact with more or less excessively ferruginous slag previous to being poured, the metal is more or less highly charged with oxide of iron; and that if no metal or metalloid—such as aluminum, silicon, titanium, capable of reducing this oxide is added to the liquid steel on cooling down, the chemical reaction, referred to by Prof. Howe will follow, and the steel will give off gas and produce honeycombed ingots.

On the other hand, if the slag towards the termination of the finishing is rich in silica and low in oxide of iron, the oxide dissolved in the metal may actually absorb any excess of oxide dissolved by the metal at an earlier stage of the process.

It is possible that an excessively limey slag in the basic process, provided it is coincidentally impoverished in iron oxide, may also act in a similar manner.

Honeycombed Steel.

Liquid steel, which gives off gases during cooling through the fluid state, always continues to yield gas during the period when the steel is plastic; these bubbles cannot escape, and the cold metal is in consequence always more or less "honeycombed". In very gaseous steel, it is difficult to keep the metal in the molds, for when the upper part of the steel is passing through the plastic stage, the gases continue to be evolved from the still fluid liquid below, and in the semi-solid steel at the top a frothy mass is formed which ascends and flows over the sides of the mold. In such a case it is usual to chill the upper liquid layer, cover it with sand and plate it down; by doing this the gases are prevented from escaping, and must incidentally exert very great internal pressure. Cases are on record where the pressure was so great that, after the steel in the ingot had been plated down, it burst the layer at the top, and lifted the mold itself from its base. Although this ingot when cold was not broken, there can be no doubt that it was extremely honeycombed. Fortunately another ingot, solidified from very mild steel, was obtained at a later date, and the fractured surface was photographed. This is shown in Fig. 3, from which it will be seen that approximately one-third of the whole mass is occupied by gaseous honeycomb cavities, which radiate from the outside towards the center. The uneven section of the ingot was produced when being broken. The billets rolled from this ingot were naturally much *roked* by longitudinal fissures, which, however, did not penetrate to a depth of more than 1 millimeter. Below this the blow-holes appeared to have been completely welded together.

It is recognized that the blow-holes are in the least objectionable position when they are located well within the external surface of the ingot, and steelmakers endeavor to fix the composition of the steel so that they will occupy that position. The most objectionable position they can occupy is close to the external skin.

Many years ago, the author's attention was drawn to some ship plates rolled from ingots of the honeycombed character just mentioned. The heating of the ingots had been so elevated as to oxidize the thin outer layer of solid steel and melt the scale of the surface, and this had run down and filled the honeycomb cavities, so that when the ingot was rolled the oxide remained imprisoned near the surface; and when cold, and the plates were struck with a hammer, little pieces of oxide jumped out, leaving unseemly pits on the finished plates, which, of course, on that account had to be rejected.

Blow-hole segregations of a billet rolled from a honeycombed steel ingot are shown in Fig. 4, while Fig. 5 is a section of a billet rolled from a portion of the same liquid steel made free from honeycomb in a separate ingot by the addition of a little aluminum.

Honeycombed Ship Plates.

It will be seen, then, that where these blow-hole segregations are detected in rolled steel, one may be quite certain that they were at one time coincident with actual cavities, and that as one can thus locate with certainty where they exist by etching the polished steel, it is possible by microscopic examination and by bending the etched pieces to find out whether they have been welded or not, for, if they were not welded, the original faces of the unwelded cavities would at once open out into fissures, and the crystals would not be found common to the side of the blow-holes closed up.

Prof. Howe has also made a special examination, by the bending method, of boiler plates rolled from a honeycombed ingot, and says that "on bending the cut and polished sections double in such a way that any blow-hole traces present ought to gape open like the cards of a bent pack," but as a matter of fact he found only traces where this actually did occur, "which were so short in length as to indicate strongly that a very great degree of welding had occurred," and suggested that these relics of blow-holes tend to show that the blow-hole gases had been reabsorbed by the metal to a very great degree. He then suggested "prolonging the exposure of forged blooms to a temperature above the welding point so as to complete the reabsorption of the gas while the metal is still weldable."

Although the author has examined many specimens of rails, forgings, and plates rolled from honeycombed ingots by bending, he has rarely found that they behaved in the manner described by Prof. Howe, unless there existed distinct particles of slag or manganese sulphide, which would, of course, prevent the metallic surfaces from coming

in contact and welding together. That welding up of the blow-hole cavities in ordinary practice is, as a rule, complete and perfect has been proved by microscopic examination of a large number of specimens at the points where blow-hole segregations indicated that small cavities had originally existed.

Piping in steel ingots is always coincident with the complete or partial absence of blow-holes, or evolution of gas from the steel when it is in the plastic state. When gases are liberated in sufficient quantity, piping is impossible.

All steel in cooling towards the point of solidification contracts, and as solidification proceeds from the cold sides of the molds in an inward direction, and when no gases are evolved in the steel as it passes through the plastic state, the liquid contracts and sinks down the center, leaving a pipe or cavity, but if gas is evolved, it causes the whole mass of plastic steel to expand, which more or less balances the contraction of the metal still remaining liquid, with the result that no pipe or very little pipe can form, or the volume of plastic steel and the gases together may increase and cause the metal to froth over the top of the mold.

When making commercial structural steel, manufacturers usually aim at having the metal in the condition so that it shall not pipe or that it shall yield sufficient gases to cause the mass to expand as a whole—in other words, so that the volume of gases evolved in the plastic steel is equal to the contraction of the liquid metal.

In cases where the cavities consist of central continuous pipes, long experience has shown that finished rails and forgings made from piped steel ingots are almost invariably unsound in the parts where the pipe existed, and that welding together of the walls of the pipe cannot be depended upon, and, as a result, it is usual to reject the parts of ingots in which there is a central cavity when the object is to obtain perfectly sound finished material.

It is obvious that if the uppermost layers of steel in an ingot could be kept fluid across the whole area or section till the metal from the bottom to an inch below the surface had solidified there would be no piping, and if the steel were of a non-gaseous character there would be no blow-holes.

This fact is fully recognized by steelmakers, and various methods have been suggested, and some of them adopted, to obtain, as near as practically possible, that condition. Some of these methods follow:

By very slow teeming the steel into the molds, so as to give the portions poured in advance time to contract and even solidify before the molds are filled.

By keeping the uppermost layers liquid by heating with a blow-pipe flame, and, with the same object, pouring liquid steel slag on the surface of the metal.

The surface layers have been superheated by the introduction of a thermite reagent.

By lining the upper parts of the molds with loam or fire brick.

In the casting of crucible ingots the introduction of highly heated fire clay cores, which are placed on the surface of the liquid steel in the mold, and filled with a portion of the steel retained, for that purpose, in the crucible.

By slow teeming into inverted ingot molds, with the wide ends of the molds uppermost and the small ends down.

Freedom from piping is also effected by compression of the steel in the ingots during its solidification.

Judging from the evidence advanced, it seems certain that if the blow-holes in steel ingots are subcutaneous and the heating of the metal is sufficiently high, say 1,000 degrees Cent. and above, and the ingots are then rolled or forged, they weld up completely, unless the cavities themselves contain foreign matter. The wash-welding, as practiced in Sheffield, and the heating and rolling of steel for rails and billets effect this.

It is, however, doubtful whether or not the pipe cavities can be so readily welded. The upper ends of the pipes in ingots are open to the gases of the heating furnace, and the walls of the cavities become coated with oxide scale, which effectually prevents the metallic surfaces from coming into contact. When, however, the pipe is deep and is bridged over at intervals with diaphragms of solid steel, it is not improbable that welding below these bridges might be effected, provided that the imprisoned gas become forced back into the steel and do not form layers of highly compressed gas between the steel surfaces, and so prevent these surfaces from coming into direct contact.

Prof. Howe's suggestion that the forged steel blooms should be heated for a long time to above the welding point, so as to complete the reabsorption of the gas, is based on two assumptions; first, that the gases of the cavities are capable of being forced, by pressure, into the hot steel and become occluded there; and second, by that what is not so forced into the metal will diffuse into it during prolonged heating at a high temperature. Like all Prof. Howe's contributions to science, this suggestion opens the door to a great field of research.

A View of the Foundry at Close Range[1]

By B. D. Fuller

We, who follow the foundry industry as a means of livelihood, must ever be thankful for the existence of the American Foundrymen's Association, as it has undoubtedly been a great source of useful information and education, and has accomplished much towards foundry advancement. We are accustomed to listen to learned technical discussions, and do not question their worth. But there are many among us who understand terms such as *air blast, coke, fire clay,* etc., who are more or less lost when discussion of the same subject is couched in such terms as *carbon dioxides, monoxides, calcium, alumina,* etc. For such as these a talk on the every-day, common-place subjects connected with the shop may not be considered out of place. Foundrymen (and I am one of them), whose pleasure it is to religiously visit the cleaning room bright and early each morning and seeing a casting with the sand dropping away from it, leaving a clean, smooth surface, cores falling away with little labor, no fins, scabs, or buckles—a job which speaks of good, mechanical, heady work—feel a thrill of pleasure as of an artist when gazing upon a masterpiece, and on the contrary, feel disgust and disappointment upon finding a casting with sand burned-on, cores hard, or surface showing scab or swell.

What can the *man behind* do towards being of assistance in accomplishing the desired end—good castings at reasonable cost?

When the problem consists of a shop full of work of a more or less intricate character, with good molders scarce, and a class of men to rely upon, the majority of whom are unskilled, there are many things to be considered, not the least of which is the sand. There is nothing in connection with the foun-

[1]Presented at the Pittsburg convention of the American Foundrymen's Association.

dry more worthy of careful study, and constant watching, than sand. I am not going to pose as an authority on sand specification by analysis, but where men are working a sand, not suitable on account of being too close to stand hard ramming with a minimum use of the vent wire, coke bed, or other means of carrying away gases; or the other extreme, a sand too sharp and lacking in bond, contributing towards loss through wash, or drop-out, I will guarantee that, given the same men, sand properly mixed and tempered and of a nature to stand ramming, containing bond enough to stand up well in pockets or overhanging projections in the mold or core, and at the same time vent freely, you will find a very marked improvement in quality, as well as decrease in cost of product. Time devoted to ascertaining the proportions of new and old sand in facing and core mixtures, to seeing that mixing machines are properly operated, that the right proportion of binding material and no more is used, is well spent.

Establish your system and see that it is lived up to, and not changed without a good reason and with your consent, and a substantial saving in material plus better product is bound to result.

You may say: "We are mixing core sand 1 to 60." Do you know this to be true? Have you taken time to work out the proportion and provide means of measuring and mixing, about which there can be no guesswork?

Use of Cast Arbors.

Again, when large cores are made in quantities, the use of cast arbors, as a means of safety and economy, is generally overlooked. When you have a stock of arbor patterns, it more often means but a slight change to adapt an old pattern to a new job. Suppose it does require one or two men to mold these open sand arbors every day. The cast arbor will save days of time in cutting and shaping wrought iron or steel rods, will give a firmer and more stable core, and enable the coremaker to use fine coke or venting material, where he otherwise could not make use of it, which all means that a good core can be produced by a man whom you would not consider the best mechanic. By being enabled to produce good work, such a man soon gains confidence in himself and goes after things in such a manner that before long your painstaking, careful mechanic is left behind in amount of work produced, for he will not *take a chance*, as he is apt to term the breaking away from his *slow but sure* method.

It may, on first sight, look like extravagance to allow rope slings to be used in a shop on core and molding floors where chain or iron beam and sling could be used. But when we figure the gain in time, due to the speed of adjusting a rope which adapts itself to all shapes, I believe, in many cases, it is an actual economy to use them. Also, we can see when a rope has outlived its usefulness, as it will give warning, where a chain will snap unexpectedly, often causing accidents which are an everlasting regret.

Rope Slings.

The practice of drying molds may be carried to an extent which may seem an extravagance at first sight. What I mean is, to walk into a shop and see right and left the burning of charcoal in pans suspended in molds or charcoal in a mass upon a sheet of corrugated iron covering a mold. Here again may be an economy, in that men who would require years of careful training to make thorough green sand molders, can, in a comparatively short time, be taught to do good work through dry sand methods. The mold can be rammed harder. It requires less venting, and when wet-blacked and slicked, gone over with a final plumbago wash, will give surer results, provided the facing sand is right.

Where gas is obtainable, this is one of the best agents we have for mold-drying, as burners may be formed for jobs which are in day after day, and *stunts*, such as drying drag cheek and cope of the same mold at the same time with the one burner can be carried out, thus saving time, money and space.

Most of us know of the stopper brick used in the bottom of the steel foundry ladle. Brick of this general design with ½-inch wall with hole 1, 1½, 1¾, 2 and 2½ inches in diameter, will be found very handy and economical when used in making pouring gates and runners on heavy work. They are generally made in sections, 6 inches long, fitting one into the other, can be laid in the mold in any direction, like laying sewer crock. They will not blow or swell, and when rammed in, cannot burst. The cost is reasonable and the economy in use quite considerable; again, they are one of the means to an end, cutting down the risks and helping the output.

Molding Pits.

As a further safeguard, the pits in which large castings are made, time after time, should be carefully arranged to minimize risk. Binders should be placed across the bottom, heavy cast iron plates on these binders and curbing at least part way up the walls. Proper means should be provided for adjusting bolts from bottom binders to cope, etc. All these are well known safeguards, but when applied, make the daily work much easier, and save many a casting.

On this class of work a pneumatic rammer in the hands of the molder's helper makes him about as valuable as the molder himself, at least while the ramming is going on, for the outside or back ramming can be done as well by the helper with the air rammer, especially when under the molder's eye.

That indispensable adjunct of the foundry—the pattern shop—is a veritable gold mine, passed over by many a prospector, *having eyes, yet seeing not*. Yet here lies hidden a well nigh inexhaustible fund of help worth much time and study. First consider, we must depend upon the pattern shop fully as much as the foundry for the success of the molding machine, and here let me say, that the molding machine is first of importance on my list of appliances necessary to success. This is too broad a subject to be covered in this paper, but to emphasize the above statement, I will mention the fact that the Westinghouse Electric & Mfg. Co. has in its iron and brass foundries, upwards of 600 machines in operation.

Pattern Shop.

The more simple the machine, the better the results, as a general statement. I am sometimes lost in trying to figure out what would be the result were we compelled to turn out our foundry product entirely by old, hand methods. As yet, the field for advancement in this line is great, especially is this true of the large jar-ramming type for heavy work, with its adjuncts, the grab bucket for handling sand, and the pattern-drawing device used independently of the machine.

Construct patterns for the molding machine direct from the drawings where at all feasible, for not only do we save the cost of original patterns, but save money on every casting *right from the jump*. Small castings made by hand from loose patterns cannot be compared, as to quality or cost, with those made upon molding machines from proper patterns.

As within the scope of this article, I wish to say something of patterns other than those for the molding machine. Second only to the machine in importance is the match-plate system, meaning by this not simply plates with one-half pattern on each side to ram cope and drag upon the same plate, but parts on separate boards, or plates, and as is true of the machine, the more intricate the design, the more they are worth.

In some cases, as many as four separate plate patterns for a four-part mold are being used, and these are patterns up to 8 feet long, and even larger, from which castings are produced. Here again, the man not considered the finest

mechanic will produce good work. He cannot abuse the pattern by beating it with a hammer, as he cannot reach it. The gates are formed as part of the pattern, thus doing away with a source of much loss and trouble, for many a job is spoiled in the cutting of the gate.

Pattern-Drawing Device.

As a general thing, these match plates can be drawn from the mold by means of the simple guide pins in the flask, leaving a perfect mold, but when the draw is too intricate for this method to be successful, a simple drawing-device can be applied by hand to the match-plate after the mold has been rammed and rolled, which will give a perfect mechanical draw, leaving the same as fine as any machine-made mold.

Suppose we wish to make a casting of the shape of an oil or molasses barrel, to be cast on end. The usual

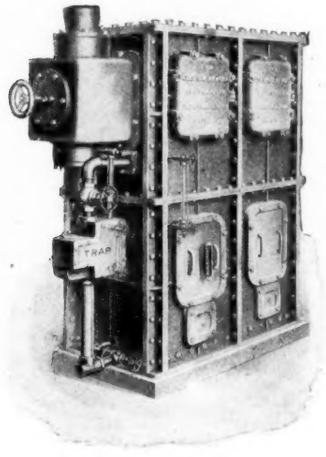


FIG. 1—THE COOKSON CAST IRON HEATER

procedure would be to make the pattern in two parts divided in the center at the greatest circumference, thus necessitating a deep cope, or in case the pattern is large, 8 to 12 feet in diameter for instance, we would bed it in the floor, make a slanting parting down to the center, or dividing line, and use lifting plates. We part again at the top line, lift plates from the center with the cope, draw both parts of the pattern, replace cope, release bolts to lifting plates, lift cope and finish the mold.

Novel Molding Method.

Good results can be obtained by this method, but suppose we make the center or core of this pattern, to resemble a section of water pipe, build on the outside in staves, fastening staves by eye bolts through the center pipe, cover the upper end of the pipe with a lid, ram up simply a two-part mold, lift the cope, remove the lid of the pattern, unscrew the eye bolts, draw out the center and draw in the staves; the result is a perfect mold, made in much less time, doing away with center parting, much lifting, etc. Can you guess how much this means in a shop where patterns of this style are numerous?

The cupola, cleaning department, yard labor, accounting and cost departments, are all subjects calling for time and study, not to be covered in the limits of this article. But I cannot close without a good word for the efficient office man as a valuable assistant. Daily reports are looked upon by many as *red tape*. On the contrary, they are of great value in enabling one to locate trouble and to appreciate things of worth. It is a nice thing to be able, from reports before you on, say the 15th of the month, to calculate in a minute's time, within a small fraction of a penny per pound what your castings will cost at the end of the same month. Such records are not difficult to obtain, nor is the system intricate. I have seen results obtained in shops without any modern equipment to speak of which command admiration. I have in mind, in the city of Buffalo, a shop presided over by an unpretentious man, but a man who knows his shop, and who knows his men.

We often hear it said that "to be a success as a salesman, one must be a mixer," and this is true of the foundryman. He must be a mixer, not in the generally accepted sense of the term, but a mixer who can, at the same time, command the respect and confidence of those under his supervision.

The Cookson Heater

The cast iron heater shown in the accompanying illustration, built by the Bates Machine Co., Joliet, Ill., is equipped with a large oil separator of sufficient capacity to purify all of the exhaust steam from the boilers or engine of the greatest capacity which the heater can serve. The heater is built with a cut-out valve in the separator to permit of cutting out the heater for cleaning without interfering with the functions of the oil separator, and has exhaust inlet and outlet connections in a direct line to permit the heater to be inserted in a vertical exhaust line without disturbing the pipe, except to remove a short length to admit the separator. The exhaust steam enters the separator at the bottom and passes out through the outlet at the top. As the steam leaves the engine exhaust pipe, it first passes through a tube projecting inwardly on the inlet flange and cut to open at an angle opposite the opening on the heater inlet tube. The steam is then divided by a V-shaped, ribbed baffle, cast on the under side of the heater inlet tube, which deflects the current to the separator walls. The steam currents, therefore, must travel back again before they reach the exhaust outlet or the inlet tubes to the steam chamber of the heater. In the meantime the oil and water particles are dashed against the separator walls and are carried down into a well formed around the exhaust inlet tube, but out of the steam current. This well drains through a balanced float trap and empties into the heater overflow pipe. As the oil drain connects with the overflow pipe below the valve in this pipe, the separator can drain through the trap when the heater is cut out. All steam not going to the heater passes through a tube on the outlet flange, similar to that on the inlet flange, but sloping downward and with an angle opening out in the opposite direction to that on the in-

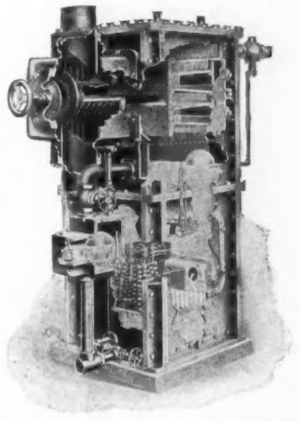


FIG. 2—INTERIOR VIEW OF HEATER AND RECEIVER WITH CUT-OUT OIL SEPARATOR

let, thus compelling the steam to travel in an opposite direction to that in which it entered.

Steam for the heater passes through a central horizontal tube, which is faced on the outer end to form a tight seat for a valve actuated from the outside of the separator. This valve regulates the inflow to the heater. Steam is drawn into the heating chamber on the vacuum or induction principle. Cold water enters the heater near the top and flows into a spray box which is notched on the edge to spread the water in small streams into the top trays and successively in a thin layer over the other trays and into the reservoir. Provision is made for skimming the reservoir surface by an overflow plate that extends horizontally the depth of the heater and drains an even sheet of water into the overflow pipe. Suspended impurities, which are too heavy to float, are removed by the filter bed.

A Shop Truck Equipped with Sectional Trays

A Shop Truck With Sectional Trays

Shop trucks, in nearly all instances, are built to suit the individual requirements of the shop in which they are used. What would be satisfactory for one kind of work would be of little use in another. Some simple principles are common to nearly all, as the majority are built either on the unit or the sectional plan. The sectional principle, adapted for special work in his shop, has been carried out in the multiple tray, hand, floor trucks used by Adolph Muehlmatt, Cincinnati.

The truck has a light skeleton frame, five inches deep, jointed at the corners and secured by steel corner straps and carriage bolts. Four ½-inch rods tie the frame together, and two bottom boards, carrying the wheel brackets, stiffen the frame endwise. The truck is 40 x 28 inches in size and is mounted on four wheels. Wherever possible, bolts have been used instead of screws. At each end of the main frame and in each separate tray are 1½-inch holes, *A*, as shown in the accompanying illustration, to receive the ball castors provided on each tray.

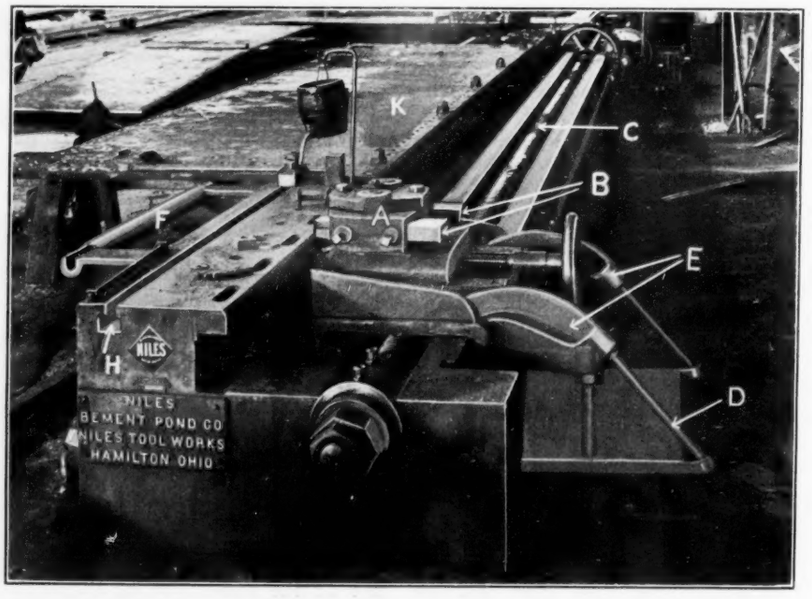
The trays are freely movable in their castors, making each tray unit an independent truck. Each tray in turn has castors that fit into the next tray, making the ball castors serve as dowels for the truck sections, so that as many trays as desired can be piled on the truck. The corner bolts, *B*, extending vertically in each tray, carry the weight of the trays when filled, as the bottoms of the bolts rest on the heads of the succeeding upper trays and transmit the weight to the lower support.

The bottom of each tray is laid on the through bolts, *C*, as illustrated by the tray set diagonally on the smaller truck. The trays are built to carry certain parts which are left on them and transferred from one machine to another for each succeeding machining operation. The truck at the left is loaded with three trays of engraving blocks, carrying 24 bases per tray, or 100 in all, of a total weight of 1,500 pounds. To accommodate these special castings, each of which weighs about 15 pounds, wooden supporting pegs, *E*, 1½ inches in diameter, are spaced at equal intervals, while three smaller pegs, *F*, are fitted in the tray board, projecting about one-half inch above the surface to support the casting. At *H* is shown a hole and supporting pegs to support a casting of special shape, having a long, privoted extension. In this case the tray has a hole instead of a post for carrying work. In both trays the castings are suspended about one-half inch above the bottom board of the tray so that they can be readily picked up. Modifications of this tray and its interchangeable sectional units can be utilized in any shop having duplicate work requiring a number of machining operations.

Planing the Edges of Large Plates

For planing the edges of large plates for gas holders, the Stacey Mfg. Co., Cincinnati, uses a Niles open top planer, built by the Niles Tool Works Co., Hamilton, O. The table is stationary and the head, *A*, carrying two tools, *BB*, moves, being driven by a 4½-inch triple thread lead screw, *C*, having one thread to the inch. Power is furnished by a 30-horsepower reversing, direct current motor, operating at 715 revolutions per minute. The motor is connected to the driving lead screw through spur gears and a friction clutch. Automatic reversing stops can be set at different distances to suit the work being handled. The planing head carries two tools with the cutting edges in opposite directions so that a cut can be taken in both directions. A hand-operated cross feed controls the depth of the cut taken. The operator stands on a platform, *D*, that is suspended below the cutting head by iron brackets, *EE*, and moves with the cutting head.

The table is 31 feet long and 16 inches wide. In the top of the table, extending its entire length, is a 1⅛-inch T-slot, *H*, three inches from the front edge of the table, for clamping down the work. A roll support, *F*, placed on a line with the top of the table supports the work, *K*, held on the table. The planer can be run up to a cutting speed of 26 feet per minute. Work of any thickness can be placed on the table, while a tool, 2½ x 3 inches, can be placed in the tool holder.



Open Top Planer Used for Planing the Edges of Wide Plates

New Eight-Spindle Drill

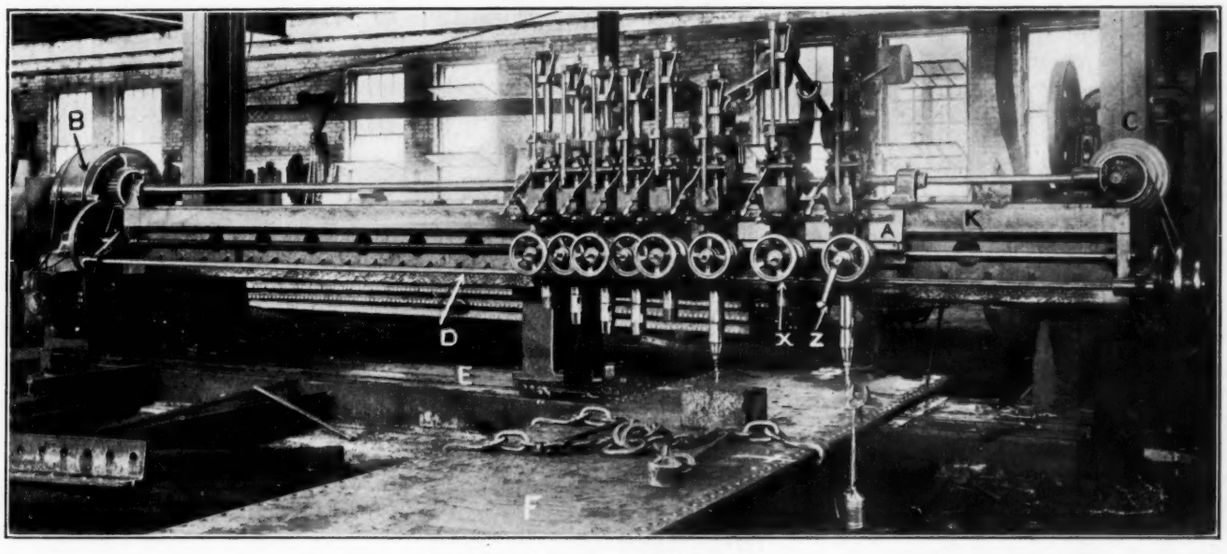
An eight-spindle rail drill, embodying several new features, has recently been built by the Niles works of the Niles-Bement-Pond Co., Hamilton, O., for the Stacey Mfg. Co., Elmwood Place, Cincinnati. Each of the eight-spindle heads is movable within a limited distance and the eight spindles are collectively mounted on a moving head, *A*, shown in the accompanying illustration, which has a travel of about 21 feet from end to end of the main bed, *K*, of the drill. The main column is 23 inches above the table of the machine and the three supports are spaced on 8-foot 8-inch centers, which permit work of this width to pass through between them over the table of the drill if necessary.

Two motors are used, one for driving the drills and the feeding mechanism, and the other for operating the movable head and spindle, lengthwise of the machine. A 35-horsepower, four-pole, direct current motor, *B*, capable of running at any speed from 600 to 1,200 revolutions per minute, supplies the power and is spur-geared to a three-inch shaft extending nearly the entire length of the machine. The driving motor is mounted on a cast iron pedestal, two feet five inches high, on the front of which the starting and controlling rheostats are mounted. The starting switches are attached to the back of the pedestal. A two-horsepower, two-pole, direct current motor, running at 1,750 revolutions per minute, is mounted on the base of the machine and is belted to the traverse driving mechanism of the sliding head with a one to six speed ratio.

On the three-inch main driving shaft a sliding, keyed clutch is used to transmit the power through two spur gears to an auxiliary driving shaft that extends the length of the horizontal main traveling head. On this auxiliary shaft are eight bevel gears that engage bevel gears on the reduction transmission on each spindle head. The spindles are driven through spur reducing gears, each spindle being provided with an individual sliding clutch for starting and stopping the drill, as required.

At one end of the main driving shaft is a pair of four-step, cone pulleys, *C*, and a worm gear, operating a 1½-inch feed shaft, *D*, that passes through each head and from which positive power feed for the various spindles is obtained. Each spindle carries a positive disengaging clutch. A hand wheel, *X*, on this clutch enables the operator to lower and set the drill on the work quickly. A rack and pinion operated through a removable handle, *Z*, on each head, are used to move the individual spindles on the horizontal head. A lead screw, driven through a reversing device from the two-horsepower motor, moves the main horizontal head.

The top of the table, *E*, is only a few inches from the floor so that long steel plates, *F*, can be placed on it flat without bending or buckling. The plates are clamped down by means of clamps and T-slots. The drill is provided with bronze bearings and oilers wherever needed to reduce the wear and keep it in alignment. Although built to drive drills up to and including 1 9/16 inches, any size drill can be used within the limits of the power of the motor. Work is delivered to and from the drill by a traveling crane.



A Large, Eight-Spindle Rail Drill

The Lake Supply Co., Chicago, has certified to a change in name to the Keystone Pattern Co.

Book Reviews

The Principles of Scientific Management: by Frederick Winslow Taylor; 144 pages; 6 x 9 inches; bound in cloth, price $1.50. Published by Harper & Bros. and for sale by The Penton Publishing Co., Cleveland.

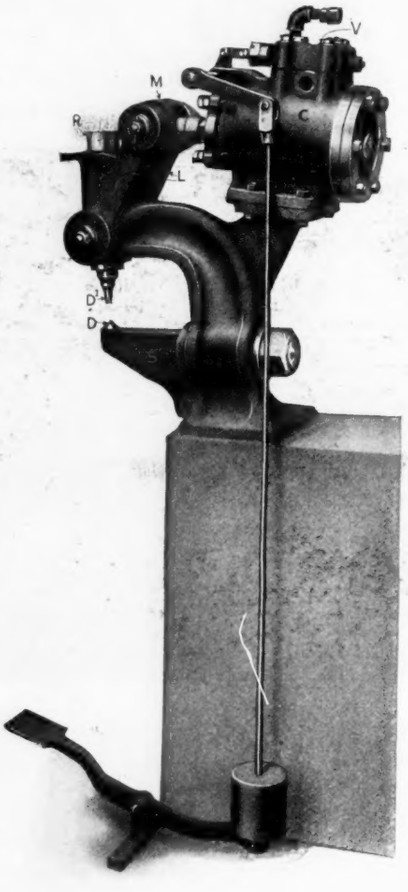
Like all men of unusual force of character who undertake to do things in a big way, Mr. Taylor has his warm supporters and his caustic critics. For a number of years, Mr. Taylor's advocacy of scientific management has been watched with interest by many observers who were more or less directly interested, but it is only recently that the world at large has discovered that there is such a man as Fred W. Taylor. Following his appearance before the interstate commerce commission, while that body was inquiring concerning the reasonableness of railroad rates, Mr. Taylor has contributed a number of articles to the *American Magazine* on the principles of scientific management, and that subject has been discussed at many meetings and in periodicals by his supporters and opponents. His ideas are thoroughly explained in the book under review, and it is extremely interesting, whether one agrees with Mr. Taylor's conclusions or not. Perhaps the reader would find it difficult not to have misgivings concerning some statements made in this book. For example, in discussing the handling of pig iron according to the plan which has aroused much discussion, whereby the tonnage which one man could load was raised from 12½ tons to 47½ tons per day, Mr. Taylor states that seven out of the eight men in the gang of handlers are physically un-

able to work at the pace. One of the eight, however, has one necessary requirement—almost entire lack of intellect. "He merely happens," says Mr. Taylor, "to be a man of the type of the ox." Mr. Taylor insists very vigorously that his plan is not for overworking men, but in the case of the pig iron handlers, it seems to us clear that his plan would overwork seven out of eight men. "The system of management advised by Mr. Taylor," says *Industrial Engineering*, "aims always to improve the worker and stimulate his manhood; to raise his pay by instructing him and making him more efficient. He does not countenance for one moment the driving of men beyond the limit of their endurance." If this is true, the prominence which Mr. Taylor has given his experience in handling pig iron is rather unfortunate. The main criticism, however, that we have to offer, is that too much has been claimed by his friends for Mr. Taylor's scheme of scientific management. But it is equally true that his efforts have been unjustly belittled by some of those who do not agree with him. While his book shows how much might be accomplished in big manufacturing concerns, it offers very little for the small shop. We certainly do not agree with the *American Machinist*, when it says that in the movement toward intensive production Mr. Taylor has been a contributor through his invention of high speed steel, but not otherwise. The testimony of such men as Wilfred Lewis, president of the Tabor Mfg. Co., shows positively that this is not true. On the other hand, we believe that there are many others, notably F. A. Halsey, who have done much to improve shop conditions, and bring about better relations between employer and employes.

The introduction to Mr. Taylor's book arouses expectations which are not realized by the reading of the volume. If, as the author says, the same principles which he has applied to the shop can be used with equal force in all sorts of activity, he will find it necessary to write a number of additional volumes. Mr. Taylor expresses the hope that it will be clear to his readers that the same principles can be applied, for example, to the management of our farms. But if any farmer should happen to read this review, we trust he will not buy the book with the expectation that he will get any large amount of information to apply to his vocation. However, the subject of scientific management is one about which every well informed man should know something, and one cannot have any definite idea concerning discussion on efficiency and scientific management unless he is familiar with the theories of Fred W. Taylor. Hence, we would strongly recommend the reading of this volume.

Principles of Metallurgy; an Introduction to the Metallurgy of the Metals, by Charles Herman Fulton, E. M.; XII + 544 pages, 4 x 7 inches. Published by the McGraw-Hill Book Co., New York City, and supplied by THE IRON TRADE REVIEW for $5.

As president and professor of metallurgy of the South Dakota School of Mines, Professor Fulton was brought to a realization of the difficulties faced by the student in the very beginning of the study of this fascinating science. Keeping these difficulties in mind, Prof. Fulton succeeded in writing a very clear, helpful and self-explanatory introduction to the science of metallurgy, the first of its kind to be published in the United States. Beginning with a running historical sketch of the discovery and early use of the most useful metals, the book enters at once into a discussion of the physical mixtures of metals and their thermal analyses, passing to consideration of the physical properties of metals. Alloys, their composition and physical properties, are clearly explained. The chapter on the measurement of high temperatures and the various methods employed must prove fascinating to the student. Typical metallurgical operations, the consideration of slags, matte, bullion and speise, refractory materials used in furnace construction, fuels, combustion and various methods for preheating the blast for different furnaces make up the subject matter of the remainder of the book. Its publication marks a real advance in metallurgical text books, for there are others than beginners who will be greatly interested as well as mentally improved by careful study of Professor Fulton's work.



AN ADJUSTABLE STAKE RIVETER

An Adjustable Stake Riveter

An adjustable stake riveter of unique design and construction, built by the John F. Allen Co., 370 Gerard avenue, New York, is shown in the accompanying illustration. This is one of the smallest riveting machines built by this concern and has a 7½-inch reach, variable gap and a 5½-inch cylinder. The riveter is designed for use on sheet metal work, on which rivets are used from ⅛ to ¼ inch in diameter and are driven cold. The stake, *S*, can be easily removed to permit of the use of other stakes, suitable for the work in hand. This materially increases the range of work that can be handled and will be found exceedingly convenient, as stakes can be made of any shape or size at a small cost to meet the requirements of the most unusual and difficult jobs. The machine can be operated either by a foot pedal or a hand lever. The work to be riveted is placed with the head of the rivet resting upon the holding-on die, *D*, so as to bring the end of the rivet in line with the upper die, D^1, which is usually about ½ inch above the top of the rivet. By pressing the foot treadle, air at a pressure of from 60 to 100 pounds is admitted to the cylinder, *C*, thus causing the piston to move forward and the side links, *L*, and the middle links, *M*, to assume a position parallel to the axis of the ram, *R*. The ram carrying the upper adjusting die, D^1, is thereby forced down upon the end of the rivet, forming a head with one stroke. By relieving the foot pressure on the treadle, the slide valve in valve chest, *V*, reverses the motion of the piston and this returns the ram, *R*, to its original position ready for the next rivet. The amount of air consumed per rivet does not exceed one-fifth of a cubic foot. If preferred, the riveter can be operated by steam.

IRON AND STEEL SECURITIES

While the actual improvement in the business situation last week was unimportant, yet the sentiment concerning the future of business as reflected in the New York stock market was decidedly favorable.

Prices opened firm on Monday, reacted on the decline in Steel common, recovered most of the loss, and closed steady; the supreme court declared the American Tobacco Co. a combination in restraint of trade, and ordered either dissolution or re-organization within eight months; Jones & Laughlin Steel Co. announced the sale of $10,000,000 additional 5 per cent bonds, part of the original issue of $30,000,000 authorized. The American markets were closed Tuesday on account of Memorial Day. On Wednesday the general market declined one to three points, but closed firm after a strong rally. On Thursday the market was strong from the beginning to end; Bank of England rate of discount was unchanged at 3 per cent; railroad reports for April showed gains in net earnings. Stocks were active on Friday, firm and higher, and prices reached the highest average of the year; government cotton report shows a relatively optimistic condition; wheat market was strong and higher. The market was active and strong on Saturday, ranging from the best at the closing; grain and cotton markets were firmer.

Call money ranged from 2½ to 2 per cent. Time money became slightly firmer in tone during the week, lenders demanding somewhat higher rates. The actual condition of clearing house banks was reported as follows: Loans increased $12,601,200; deposits increased $6,755,700; reserve required increased $1,689,525; surplus decreased $7,977,825, standing at $36,409,600; and the percentage of reserve 27.61, compared with 28.20 the week previous. Non-member banks and trust companies showed loans decreased $4,517,900; net deposits decreased $5,024,800; reserve on deposits increased $502,500, and the percentage of reserve 17.9, compared with 17.8 the week previous. The fortnightly railway statistics showed a decrease of idle cars of 20,614 to 168,233, the greatest decrease being in coal cars. Commercial failures for the week were 208, compared with 240 the preceding week, and 152 the corresponding week last year.

Bank clearings for the week showed a small decrease from the preceding week, but a decrease of 5.3 per cent from a year ago. Shares were sold to the number of 2,946,000, compared with 2,529,950 the preceding week, and 4,953,000 the corresponding week last year. Bonds, exclusive of government bonds, were sold to the amount of $18,298,000, compared with $15,390,000 the preceding week, and $11,304,000 the corresponding week last year.

	Closing Quo. June 3	Changes in week	Annual Meeting daoe 1911.		Stock Outstanding	Basis	Dividend—Last Dividend	Dividend—Date Last Div. Pay.
Allis-Chalmers	9½	+1			$19,820,000			
Allis-Chalmers, pr	33	+2	Nov.	2	16,150,000	7 cum.	1¾ Q.	Feb., 1904
American Can	12	— ⅛	Feb.	1	41,233,300		1¾ Q.	
American Can, pr	87½	— ¼			41,233,300	7 cum.	1¼ Q.	July, 1911
Am. Car & Fdy	57	+1½	June	29	30,000,000		½ Q.	July, 1911
Am. Car & Fdy., pr	120	.....			30,000,000	n. c.	1¾ Q.	July, 1911
American Loc	42	+ ¾	Oct.	17	25,000,000	5	1¼ Q.	Aug., 1908
American Loc., pr	108¾	+ ½			25,000,000	7 cum.	1¾ Q.	Apr., 1911
American Ship	68⅜	.....	Oct.	11	7,600,000	4	2 Q. **	June, 1911
American Ship, pr	111	.....			7,900,000	7 cum.	1¾ Q.	Apr., 1911
Am. Steel Foundries	41½	—2¼	Dec.	7	17,184,000		1 Q.	May, 1911
Barney & Smith	20	.....	June	6	2,000,000	4	1 Q.	Dec., 1907
Barney & Smith, pr	87	.....			2,500,000	8 cum.	2 Q.	Mar., 1911
Bethlehem Steel	33¾	+ ⅜	April	4	14,862,000			
Bethlehem Steel, pr	63⅝	+ ⅛			14,908,000	7 n. c.	¾ Q.	Feb., 1907
Cambria Steel	44⅝	— ⅜	Mar.	21	45,000,000	5	1¼ Q.	May, 1911
Cambria Iron	45	+1			8,468,000*	4	2 S. A.	Apr., 1911
Chicago Pneumatic Tool	53	+1¾	Feb.	20	6,485,800	4	1 Q.	Apr., 1911
Colorado Fuel	34⅜	+ ¾	Oct.	16	34,235,500		1¾ Q.	Apr., 1902
Crucible Steel	137⅞	+ ⅝	Oct.	18	24,578,400		3½.	
Crucible Steel, pr	83¾	+2⅜			24,463,500	7 cum.	1¾ Q.	June, 1911
Empire Steel	5	.....	Feb.	22	1,254,770			
Empire Steel, pr	50	.....			2,500,000	6 cum.	2 S. A.	Jan., 1911
Fay & Egan	70	.....	Feb.	21	1,000,000	6 cum.	3 S. A.	Feb., 1909
Fay & Egan, pr	110	.....			1,000,000	7 cum.	1¾ Q.	Feb., 1911
General Electric	164	— ½	May	9	65,179,600	8	2 Q.	July, 1911
Harbison-Walker	45	+1	Jan.	16	18,000,000		½ Q.	June, 1911
Harbison-Walker, pr	101	.....			9,600,000	6 cum.	1½ Q.	Apr., 1911
International Pump	41¾	+2⅛	Dec.	12	17,762,500		1 Q.	Nov., 1910
International Pump, pr	89⅞	+1⅞			11,350,000	6 cum.	1½ Q.	May, 1911
Lackawanna Steel	42	—2	Mar.	8	34,978,000			
Lake Sup. Corp	28¼	— ⅝	Oct.	4	40,000,000			
New York Air Brake	73	+1¾	Mar.	8	10,000,000	5	1½ Q.	Apr., 1911
Niles-Bement-Pond	94	.....	Feb.	8	8,500,000	6	1½ Q.	June, 1911
Niles-Bement-Pond, pr	104	.....			2,000,000	6 cum.	1½ Q.	May, 1911
Otis Elevator Co	72½	.....	Mar.	20	6,375,000	3	2 S. A.	Apr., 1911
Otis Elevator Co., pr	99½	.....			6,310,000	6 n. c.	1½ Q.	Apr., 1911
Pa. Steel	60	.....	May	8	10,750,000			
Pa. Steel, pr	106½	.....			16,500,000	7 n. c.	3½ S. A.	May, 1911
Pittsburg Coal Co	22⅜	+1	Feb.	10	28,104,600			
Pittsburg Coal Co., pr	87	+2			27,071,800	7 cum.	1¼ Q.	Apr., 1911
Pressed Steel Car	36¾	+1⅝	Feb.	15	12,500,000		1 Q.	Aug., 1904
Pressed Steel Car, pr	100	.....			12,500,000	7 n. c.	1¾ Q.	May, 1911
Pullman	161½	.....	Nov.	8	120,000,000	8	2 Q.	May, 1911
Railway Stl. Spring	37	+1½	Mar.	2	13,500,000	2	1 S. A.	Oct., 1908
Railway Stl. Spring, pr	101⅝	— ⅜			13,500,000	7 cum.	1¾ Q.	June, 1911
Rep. Iron & Steel	30½	— ⅜	Oct.	18	27,191,000			
Rep. Iron & Steel, pr	94¾	+1½			25,000,000	7 cum.	1¾ Q.	July, 1911
Sloss-Sheffield	50	—1½	Mar.	15	10,000,000	5	1¼ Q.	Sept., 1910
Sloss-Sheffield, pr	112	.....			6,700,000	7 n. c.	1¾ Q.	Apr., 1911
U. S. Pipe & Fdy. Co	18	.....	June	28	12,106,300	7 n. c.	1 Q.	Dec., 1910
U. S. Pipe & Fdy. Co., pr	57⅛	.....			12,106,300	2	1¼ Q.	June, 1911
U. S. Steel	78¼	— ⅛	April	17	508,302,500	5	1¼ Q.	June, 1911
U. S. Steel, pr	119	.....			360,281,100	7 cum.	1¾ Q.	May, 1911
U. S. Steel, 5s	106	.....			463,798,000	5		
Va. Iron, Coal & Coke	65	+3	Sept.	19	9,073,680		5. †	Oct., 1907
Westinghouse Electric	75¼	—2¼	July	26	3,998,700*		1¾ Q.	July, 1911
Westinghouse Air Brake	149½	.....	Oct.	3	13,750,000*		5 Q. ‡	Apr., 1911

Par value of shares, $100, except those starred (*), $50.
**Includes last 1 per cent payment of 4 per cent extra.
†Stock.
‡Includes 2½ regular, 1½ extra and 1 special.

Copper Stocks.

New York.—Amalgamated Copper closed 67⅛, a net gain of ⅛.

Boston.—Butte Coalition closed 19½, a net gain of ¾; Calumet & Arizona closed 56½, a net gain of 3½; Calumet & Hecla closed 474, a net loss of 14; North Butte Mining closed 33¼, a net gain of 2¼; Quincy Mining closed 71½, a net loss of ½.

Financial Notes.

American Car & Foundry Co. has declared the regular quarterly dividends of 1¾ per cent on preferred and one-half of 1 per cent on common stock, payable July 1.

THE IRON TRADE REVIEW

Devoted to Iron and Steel Manufacture and to the Machinery, Metal-Working and Foundry Trades.

Published Every Thursday by
THE PENTON PUBLISHING CO.,
CLEVELAND.

CHICAGO.....1328 Monadnock Blk.
CINCINNATI.....808 Provident Bank Bldg.
NEW YORK.....1115 West St. Bldg.
PITTSBURG.....2148-49 Oliver Bldg.
WASHINGTON, D. C.....Hibbs Bldg.

Subscription, United States and Mexico, $3.00 per annum. To Canada and Foreign Countries, $4.50. The price of copies issued three months or more previous to date of current issue will be 25 cents each. Advertising rates furnished on application.

Change of advertising copy must reach this office ten days preceding date of publication.

The Cleveland News Co. will supply THE IRON TRADE REVIEW through the regular channels of the American News Co.

European Agents: The International News Company, Breams Building, Chancery Lane, London, E. C., England.

ENTERED AT THE POSTOFFICE AT CLEVELAND AS SECOND CLASS MATTER.

PRINTED IN AN OPEN SHOP.

Copyright 1911 by Penton Publishing Co.

THE AVERAGE PAID CIRCULATION OF THE IRON TRADE REVIEW FOR THE ISSUES OF THE FOLLOWING MONTHS WAS:

April, 1910	5,793
May	5,827
June	5,842
July	5,864
August	5,875
September	5,895
October	5,955
November	5,993
December	6,026
January, 1911	6,058
February	6,072
March	6,091
April	6,108
May	6,112

June 8, 1911

Passing of a Veteran

The death of John J. Spearman at Sharpsville, Pa. last week marks the passing of another of the few remaining survivors of the blast furnace days now but a memory. He was one of the first to grasp the significance of the early Lake Superior iron ore movement and put his knowledge to practical use. With characteristic ambition and energy, he maintained his interest in pig iron manufacture although his age was far advanced and his daily activities were confined largely to other pursuits. His busy and useful life was a constant reminder of the truth of the statement that "a man is no older than he feels."

Courage and Frankness of a Statesmanlike Business Man

The statesman in business has proved himself at least the equal of the statesman in congress. During his examination by the investigating committee of the national house of representatives, Judge Gary was able not only to throw a flood of light upon the business methods of the United States Steel Corporation, but also to give the members of the committee a great deal more than they had expected to think about in the way of formulating government policies. Judge Gary's declaration that the Sherman act will not be found adequate, and that "we must come to publicity and government control of prices," was a distinct surprise to the country. No one had expected such a radical declaration from the executive head of a mighty corporation, and yet it is easy to show that this declaration of Judge Gary is absolutely consistent with the policy which he has pursued for a number of years, particularly since the panic of the fall of 1907, in acting in harmony with the government. Throughout the trying months that followed the panic, when, as the judge testified a few days ago, many jobbers and others were beseeching the Steel Corporation to save them from bankruptcy, and later when meetings of manufacturers were being held with a view to preventing utter demoralization in prices, Judge Gary steadfastly adhered to his policy of acting strictly within the law. And so it was at the last meeting of manufacturers held in New York, May 29, when Judge Gary not only reaffirmed his old position in insisting upon obeying the law, but urged that iron and steel manufacturers line up with the administration at Washington and "take a position foremost in the ranks of those who, in a patriotic way, are attempting to do what they can for their fellow men." He added: "I do not care whether it is a federal incorporation act the law makers may determine upon, or what it may be, if it is reasonable, or if it is determined by the administration of the law makers to be reasonable, let us—occupying a great position in the activities of business life—let us take a leading part in doing our best to bring about an improvement in the conditions which surround us."

At this same meeting, Judge Gary told the manufacturers of the "serious, disagreeable problem" which confronted them. He said he would not criticize the motives of men, but he added: "One thing we know,—that one of the leading iron and steel companies hitherto joining in our councils, learning from us our intentions, our business, our methods, our clients, our customers—everything of benefit and interest for one to know concerning his neighbor, has suddenly, for reasons considered good by those in charge, given notice that, for the present at least, it is not desirable to co-operate with us." This experience was one of many which proved the difficulty of any kind of co-operation without government supervision. Turning, with a feeling of disappointment, from recent experiences, it was perfectly natural for the judge to say to the members of the investigating committee: "We would be very glad if we knew where we could stand; if we could be free from danger, trouble and criticism from the public—if we could go somewhere to governmental authority and say, 'Here is what we have—our material, our plant, our costs, our standing, our facilities. You tell us what to charge.' But from the standpoint of making the most money, whether or not it is the wise thing, I believe it is the necessary thing."

Natural as it was, this declaration is a brave one for the head of a great corporation to make. It will be discussed from every imaginable standpoint, and probably some will assert that it was uttered as a matter of policy rather than because the speaker believed in it. We are, however, firmly of the opinion that Judge Gary was absolutely sincere

in announcing his opinion. To make public such a conviction without being willing to defend it and advocate its carrying out would indeed be reckless, and Judge Gary is never reckless. While believing that Judge Gary is a great statesman in business, and that his declaration in favor of government control was the result of mature thought, THE IRON TRADE REVIEW is not prepared fully to endorse his position. Some day we may come to government control even to the extent of fixing prices. We have made good progress in the control of the railroads, but to any man conversant with the iron and steel business, countless questions as to what the government would do in certain cases arise when he contemplates such a radical policy as that of absolute government control. Would this government control extend all along the line, from ore and pig iron to the finest wire? Would there be one basing point or many? What provision would be made in regard to extras in rolling mill practice? How would wages be regulated? These are some of the questions that would confront the government officials, who might have very little knowledge of the business of manufacturing iron and steel. They show that we must proceed slowly in extending governmental supervision. In the meantime, under recent supreme court decisions, efforts will be made to conduct great business enterprises without encroaching upon the rights of the people.

Whatever other results may follow from Judge Gary's testimony, we believe that Mr. Stanley and other members of the committee who have been antagonistic to the Steel Corporation have now no excuse whatever for maintaining such an attitude. It is clear that the Steel Corporation intends fully to co-operate with the committee in publishing all information which will be of any assistance in bringing about better conditions in the business world. Hence, we earnestly trust that the investigation will proceed with that idea in view, and that at the conclusion all may agree upon definite, helpful recommendations to be made for the consideration of congress.

Machine Tool Prices

"Would a reduction in the selling price of machine tools increase their sale?" This is a question that has been brought pertinently to the attention of machine tool builders all over the country during the last three months. With pig iron remaining unchanged at an extremely low figure and finished steel gradually weakening in price, many allied interests have attempted to prevail upon machine tool builders to make a substantial reduction in selling prices for the general "betterment of conditions and to bring a change in the present situation." The suggestion was continued until it became almost a demand. But, notwithstanding the many insistent reasons for reduction, no reduction has been made and apparently wisely so.

Machine tools vary little from year to year and few changes are made in selling prices except when a new machine is brought out. Unlike pig iron and other raw materials, a machine tool is generally sold at a price that is based upon the shop production cost plus the manufacturer's profit and the expense of selling and conveying the machine to the ultimate consumer. Machine tools are not a speculative commodity. They are almost universally sold by a large number of agents in all parts of the world.

The influences favoring a price reduction have come from the speculative end of the iron and steel industry, where conditions are at this time in an extremely unsettled and unsatisfactory state. The machine tool industry along with the other lines has felt the inactivity and suffered. Except for a comparatively good export movement, many firms have been unable to move a very large amount of their product. Domestic sales are low, and what buying the railroads have done has been concentrated with a few leading interests.

Under these conditions the manufacturers of machine tools have built for stock as many machines as they thought advisable, and then reduced the working force and the hours per day of the men in their plants, aiming to keep their organizations intact, if possible, and to retain their best men. They have realized that a reduction in price such as to cut off a reasonable profit over the cost of production would not increase their sales and would drain their bank accounts to such an extent that finally they would be forced to sacrifice a part of their stock to convert some of it into cash.

During the latter part of 1906, an enormous expansion took place in the physical equipment of the machine builders' plants all over the country. After the passing of 1907, when everybody was in the market, the abnormal demand for machines ceased somewhat and since then the consumptive capacity has been too small to provide work for the large productive capacity of the shops. When a large shop is running partly filled, there is proportionately a larger overhead fixed charge than in a small one running full capacity. This has been the situation in some of the larger machine tool plants recently. In the face of these conditions, the machine tool builders have stood firm on the maintenance of the former reasonable prices and closed down part of their shops, rather than shave off their profit when the action would in all probability have no effect in increasing total sales. In the light of the present unsatisfactory conditions in other lines, their stand seems to be well taken.

Managing Conventions

One of the most interesting features of the recent spring meeting of the American Society of Mechanical Engineers, held in Pittsburg May 22 to June 2, was the discussion of the mechanical engineering of cement manufacture at the Wednesday morning session. There

has been a demand for some time for a broadening of the field covered by the society, and in response to this it has been decided to try out the plan of giving over one session at each meeting to a consideration of some special line of manufacture in which mechanical engineers are interested. This should result in a marked increase in the influence of the society upon American engineering practice and should attract to it numerous engineers who have not heretofore found much of interest in their particular line of work in its proceedings.

At a large convention where a great many papers are presented it is a difficult problem to give each speaker his proper share of time, to prevent long drawn out discussions and to avoid a severe congestion of business at the close of the sessions. The mechanical engineers, by adopting strict rules regarding the time allowed to each speaker, have in a great measure succeeded in overcoming these difficulties, and their rules could be very profitably studied by a number of other large deliberative societies in this country. The strict enforcement of time limits may occasionally seem to inflict hardships upon individuals, but undoubtedly works out for the greatest good to the greatest number. In every well regulated technical society, the papers which are read at a meeting are printed some time in advance and may be obtained by anyone interested. There is no necessity for the author to take the time of a large number of persons at a meeting to read his paper; he could utilize this time to better advantage by merely emphasizing the points brought out in detail in the paper and adding such interesting personal comments as cannot be expediently incorporated in a printed document. The aim of a meeting is to bring out as much personal discussion as possible in the time available, and every writer is anxious to have his paper fully discussed. Many excellent papers are not discussed and the writers are thefselves to blame, because in their opening remarks they attempt to cover in a few minutes the details of a paper which it took a good many hours to write, instead of making such pertinent comment as will draw out discussion.

Noted Mechanical Engineer From Germany

Barthold Gerdau, a noted mechanical engineer, of Dusseldorf, Germany, arrived in Pittsburg a few days ago. He and Dr. Franz Haniel, of the firm of Haniel & Lueg, of Dusseldorf, came over on the invitation of George Mesta, president of the Mesta Machine Co., to attend the spring meeting of the American Society of Mechanical Engineers, held in Pittsburg. Mr. Gerdau read a paper at the morning session of the meeting, on Friday, on "Power Forging, with Special Reference to Steam-Hydraulic Forging Presses". He brought

BARTHOLD GERDAU

with him a number of lantern slides, which were used in illustrating his paper. The Mesta Machine Co. recently arranged with Haniel & Lueg for the exclusive right of building their steam-hydraulic forging presses for the United States and Canada. It has just built and put into operation a 200-ton and an 800-ton press of this type in its West Homestead, Pa., works. These presses were in operation on Friday afternoon.

The Ludlow-Saylor Wire Co., manufacturers of wire products, has taken a lease of the six-story building at 913-15 Pine street, St. Louis, and will move into the new quarters about July 1. The building was erected last year and is concrete construction. It is 39 x 109 feet. The wire company will get the ground floor space of 20 feet in width and all of the third, fourth, fifth and sixth stories.

RECEIVER NAMED

For Brown-Ketcham Iron Works—Will Continue Operating.

On bankruptcy proceedings, brought in the federal district court at Indianapolis, Judge Albert B. Anderson has appointed Frank D. Stalnaker, president of the Capital National Bank, receiver for the Brown-Ketcham Iron Works. The involuntary bankruptcy proceedings were brought by the Indiana National Bank, the Indianapolis Blue Print Co., and the Varney Electric Supply Co. The action in federal court follows the suit brought in the county courts last week by Edward W. Pierson, a preferred stockholder, who asked that a receiver be appointed. This petition has not yet been heard.

It has developed that for some time the affairs of the iron works have been in the hands of a creditors' committee, which has sought to work out some plan for protecting the interests of the creditors and at the same time put the iron works on its feet. The action in federal court was precipitated by the litigation in the county courts. Mr. Stalnaker, in a statement issued June 1, estimates the assets of the company at $1,000,000 and the liabilities at $550,000, which does not include $350,000 worth of preferred stock. The Indiana National Bank, one of the petitioners, is the holder of a $25,000 note, due May 21. The other two petitioners have small accounts against the company. The Brown-Ketcham Iron Works has made written admission to the court that it is unable to meet its liabilities as they become due. The company also says that its books do not show that Pierson, who brought the action in the county courts, is a preferred stockholder, and will resist the county court litigation.

Mr. Stalnaker has been ordered to continue operating the plant until further order of the court. The company has a large number of contracts on hand.

Welsh Tin Plate Trade

Swansea harbor trust returns for the week ending May 20, with comparisons, follow:

	Week of May 20. Boxes.	Previous week. Boxes.	Corresponding week last year. Boxes.
Received	118,316	126,002	52,322
Shipped	75,525	144,473	68,204
Stocks	235,786	192,995	122,817

The contract for a steel bridge over the Sacramento river at Sacramento, Cal., has been let to the Duncanson Harrellson Engineering Co., San Francisco. The contract price is $65,795.

Gary Urges Acting in Harmony With Government

In Address to Manufacturers—Refers to Sudden Change of Policy of Republic Company—Makes Strong Plea for Maintaining Wages

At a luncheon, given to iron and steel manufacturers at the Metropolitan Club, New York, May 29, Judge Gary spoke in part as follows:

"Gentlemen, I thank you from the bottom of my heart for your attendance on this occasion. You have come here at considerable sacrifice to your interests and to your convenience. You have come here pursuant to a well-developed, considerate, affectionate regard for your associates in the iron and steel business. You have been requested to come here for the purpose of testing your intelligence and your grit. You have been requested to meet here for the purpose of inquiring, one of the other, as to whether or not you and your business can be entirely demoralized by the disposition or the action of one individual or a few individuals in the trade.

"I believe this is a time when the iron and steel leaders should particularly take account of the existing conditions and carefully consider what course should be pursued in order to protect themselves in the future. There are many questions in which we collectively and individually are interested, aside from the mere question of securing for ourselves a few dollars. Just at this particular time our minds are filled with the late decision of the supreme court in the Standard Oil case. The entire public had been waiting most anxiously for that decision in order to determine, as far as possible, upon what foundation the business of this country rested and what it might expect would be proper and allowable concerning the future conduct of business. I have had an impression from the newspaper reports and criticisms that there might be some danger of misinterpretation of the language of the supreme court in that case, and if so, that much harm instead of good might result from that decision.

Standard Oil Case.

"I would not undertake to enter into any legal discussion of the question involved, even if I were capable of doing so, but there is a view of the decision to which I ask your attention. You have read statements made by many different people to the effect that the supreme court had modified the Sherman law and had read into that act the word 'unreasonable'. I am inclined to think even if that were true, to which I do not agree, the adoption of that view and conduct based upon it might result in very great harm to the business interests of the country generally. And I offer, simply for your consideration, this view of the decision: That the supreme court, instead of saying that there may be reasonable restriction of trade or reasonable monopolies, intended to say that in the application of the law to the facts in a case there must be reason exercised. In other words, that the supreme court has said that there must be a reasonable application of the law to a case in point, rather than that the conduct itself, if in violation of the law, must be unreasonable in order to be a violation.

Federal Incorporations.

"Now, why do I bring this up at this time? If the business interests of this country generally should reach the conclusion, by reason of the decision in the Standard Oil case, or the decision which shall be rendered in the Tobacco case, that the Sherman act, so-called, has been overthrown; that it is not of any importance so far as our future conduct is concerned; that we are not obligated to go ahead, on right lines; that we are relieved from the necessity of conducting ourselves in such a way as to evidence a regard for the interests of those with whom we come in contact—with our neighbors, with our customers, with our employes, with the public generally—that we may go on step by step, becoming worse and more unreasonable instead of better; we shall find that as a result and in the long run we will suffer by reason of such an attitude. And if that is true, then it behooves us, gentlemen, to have in mind, uppermost in our thoughts, the one idea above all others that we should conduct ourselves in such a way as to make it certain we are of some benefit and not injury to all who are influenced by or interested in the result of our business. I consider this most important, gentlemen, and I hope when we find to what policy the administration in Washington has settled down, for the governing and controlling of the great business interests of this country, that we steel and iron people in this country, instead of being found in opposition to that general policy which is calculated to be of benefit to the people of the country, will line up with the administration and take a position foremost in the ranks of those who, in a patriotic way, are attempting to do what they can for their fellowmen. I do not care whether it is a federal incorporation act the lawmakers may determine upon, or what it may be, if it is reasonable or if it is determined by the administration of the lawmakers to be reasonable, let us—occupying a great position in the activities of business life—let us take a leading part in doing our best to bring about an improvement in the conditions which surround us. I throw this out for your consideration, gentlemen, and I hope you will give it due thought, and I believe that, when the final judgment by the administrators of the law is rendered concerning our part in the business activities of this country, it will be favorable to us if we occupy the high position which I have suggested. Remember, when we are talking about patriots, statesmen, leaders of thought and action in this country, that there is no one in congress or anywhere else who has any higher duty or greater responsibility or stronger desire to promote the business interests of the people of this country than the men around this table. We do not need the suggestions of anyone in order to make up our minds as to what we shall do when these questions of ethics and economics and politics are brought to our attention. We should be the leaders and not the followers.

The Wage Problem

"Now, then, gentlemen, I should like to suggest another thought which is applicable to the question of prices of our commodities. You know by my frequent and repeated statements that I have never stood for unchanging or unchangeable prices, nor have I ever advocated prices in any line which were unreasonable or too high, taking everything into account. I have never, to my knowledge, opposed the reduction of any price suggested by a majority of the iron and steel makers, after there had been full opportunity for consultation, and generally when any one of the iron and steel makers has, after due deliberation, made up his mind that his prices were too high and ought to be reduced, I have not made any opposition in our company to following the lead of that individual; but, on the other hand, I have advocated and shall always advocate, so long as I believe I have the right to do it, the stability of prices, the regularity of business conduct on the part of all that is calculated to recognize and advance the

interests of all others. I have urged you to remember and I again call attention to the fact that when you make substantial reductions in your prices, if you reduce to a price that is unfair and unreasonable and you make so small a profit that it does not yield you a fair return on your investment and your risk, you at least place for consideration before everyone the possible necessity of reducing the cost of production, including prominently, if not principally, the wages which you are paying, or may be allowed to pay, to the man or the men in your employ. Do not forget that the laboring men—the employes of the corporations—have more at risk, when these questions are considered of reducing prices below what is reasonable and fair, than the employer, because it is just as natural as it is right and fair that if reasonable profits are prevented and your prices are put down below what they ought to be, then as a matter of necessity you are forced to consider and perhaps decide in favor of a liquidation of the wages of your employes; and you have no right to disregard them and their interests. You have no right to run the risk of being compelled to put their wages below what they ought to be unless you are driven to it, and I hope, under the present circumstances, gentlemen, that whatever may be done, or whatever may happen as a result of present conditions, you will not reduce the wages of your employes until you feel it is an absolute necessity to do so.

Sudden Change.

"Now, we are confronted with a very serious and disagreeable problem. It is not for me to criticize men nor to pass judgment on the motives of men. Whether people who have changed their minds suddenly are actuated by motives of cupidity or motives of necessity is not for me to say. One thing we know, that one of the leading iron and steel companies hitherto joining in our councils, learning from us our intentions, our business, our methods, our clients, our customers, everything of benefit and interest for one to know concerning his neighbor, has suddenly, for reasons considered good by those in charge, given notice that for the present at least it is not desirable to co-operate with us. If I believed the reason was that the officials of that company had reached the conclusion they had no right, from the standpoint of law or good morals, to continue, I would be the last one to criticize. I would not expect or ask anyone to do anything he believed wrong, legally or morally; but on the other hand, gentlemen, if anyone who has been co-operating in a lawful way, not in secret, but under conditions well known and frequently exposed by all of us, suddenly changes his opinion and believes it is for his pecuniary interest for the time being to withdraw from associating with us and declines to give us any information concerning what he is doing or proposes to do, leaving himself free to go to your customers and mine and get the business for himself, regardless of price, and simply for the purpose of filling his mill temporarily and securing for himself a customer who has been your customer or mine, then I do not hesitate to say that, so far as I am concerned, I am perfectly willing to let him stand outside of the circle of intercourse and friendly conversation and open and above-board fair dealing and frankness in expression; but if I have sufficient influence, it shall not in the least affect the relations of all the rest of us. Whatever we do in reference to prices, whatever we may decide is necessary in order to protect our interests on this occasion and under these circumstances, in my opinion it is highly important for the long future that we continue our relations of friendship and open and frank expression with reference to what we are doing. Now, I do not know the feeling of the rest of you; I do not know what you are disposed to do. I think that so far as we are concerned we would be largely influenced by the action of others; and while insisting upon the position from which I have never varied, I would not under any circumstances make any agreement, express or implied, direct or indirect, to maintain certain prices, to keep away from customers, to divide territory, to restrict output or to make any agreement of any sort or description with you or any of you, because, as I understand the law, I have no right to do it; yet at the same time, I would do what I have always said I would do, I would tell you and each of you at any time exactly what we were doing; I would give you the names of our customers, I would tell you what prices we were charging, I would give you any information concerning our business, concerning our mills, concerning our clients, concerning ourselves, that you wanted to have, so long as you have the same disposition toward me.

"Never before in the history of the business of this country, and probably of any country, have the people engaged in one line of industry occupied such a high position as that occupied by the iron and steel people in this country at the present time; and, gentlemen, while you may have read in some newspapers contrary statements made by people who were not interested in your welfare or the welfare of the people of this country generally and who talked from a political standpoint or selfish standpoint, yet you know as well as I, that you have secured for yourselves the respect and the admiration of the well-thinking people of this country and of all other countries because of your attitude in these matters."

Jones & Laughlin Co.'s Bond Issue

An issue of $10,000,000 five per cent bonds has been placed by the Jones & Laughlin Steel Co., through New York and Chicago bankers. The funds realized from the sale of these securities will go to refund heavy expenditures made out of earnings for improvements and new construction, principally in connection with the new plant at Aliquippa, Pa., and the balance will be devoted to a continuation of the company's policy of extension. The bonds just sold are a part of an issue of $30,000,000, thirty year bonds, authorized several years ago, of which $15,000,000 was put out in the spring of 1909 and the proceeds expended largely for new construction, the purchase of additional coal lands and for refunding existing obligations.

British Ore Imports

If the sales of foreign iron ore at present are small, the imports are not, and increasing quantities seem to be coming from Algeria. Ironmasters have likewise begun to get considerable cargoes of ore from the Wabana district in Newfoundland.—*Iron and Coal Trades Review*, London.

To Appraise Mines

James R. Finley, of New York City, mining engineer, has been named by the Michigan state tax commission to appraise Michigan mines in accordance with the White bill, which carries an appropriation of $30,000 to cover expenses.

New York Copper Exports

Copper exports for the week ending June 1, were 4,184 tons, an increase of 2,531 tons; from Jan. 1 to date, 126,920 tons, an increase of 20,639 tons.

The Southern Pacific Co. will replace a wooden bridge over one of the streets of San Francisco with a steel suspension structure.

Atlas Belting Co., Chicago, has decreased its capital stock from $150,000 to $98,000.

American Society Mechanical Engineers Meets

Important Papers Discussed in Steel Works, Cement Manufacture, Machine Shop, and Gas Power Sections—Visits to Industrial Plants

Because of the greatly increased range of industrial engineering activities, engineering societies have been confronted with a serious problem in arranging their programs so as to cover the field and do justice to the full membership. The American Society of Mechanical Engineers has therefore decided to discuss in a series of meetings, certain special industries in each of which a portion of its members and of the engineering fraternity at large is particularly interested, and at the Pittsburg meeting, May 30 to June 2, in addition to the usual papers of general engineering interest, one entire session was devoted to the engineering of cement manufacture and proved highly successful.

The steel works session Friday morning was of particular interest. Papers were read on turbo-compressors, reciprocating blast-furnace blowing-engines and steam-hydraulic forging presses.

The headquarters of the convention were at the Hotel Schenley, and the professional sessions were held in the lecture hall of the Carnegie Institute, close by.

Wednesday Morning Session.

The first professional session was held Wednesday morning, May 31. It was announced that arrangements have been made to finance the society's share of the obligations outstanding against the New York property by issuing certificates of indebtedness in denominations of $100 each, which will be sold to the members. These will bear 4 per cent interest and will all be retired, according to the present plan, before 1925.

A report of the committee on standardization containing a schedule of standard weight flanged fittings as agreed upon in conjunction with the National Association of Master Steam and Hot Water Fitters, was read.

The bulk of the Wednesday morning session was given over to a discussion of the mechanical engineering of cement manufacture. Walter S. Landis read a paper entitled, "Some Problems of the Cement Industry," followed by a paper on "Edison Roll Crushers," by W. H. Mason, and a paper on "Power and Heat Distribution in Cement Mills," by L. L. Griffiths.

The foregoing three papers were discussed together. It was brought out that it is possible to delay the setting of cement or concrete by the addition of gypsum, calcium chloride, plaster of Paris and similar materials, but considerable care must be exercised in order to avoid injury to the material.

Considerable time was devoted to the discussion of various methods of mitigating the dust nuisance in cement mills. Various speakers took up the relative merits of the wet and dry processes of manufacture in preventing dust, the general opinion being that the wet process is the cleaner. An instance was cited of a cement mill located near a furniture factory, where dissipation of dust was prevented by placing sprays in the stacks. Individual motor drives and power transmission by belts and shafting were also discussed.

An inspection of the Pittsburg plant of the Universal Portland Cement Co. was made Wednesday afternoon upon the invitation of President E. M. Hagar.

Wednesday Evening Session.

At the Wednesday evening session three papers on the manufacture and assembling of small parts were presented. The first paper was entitled, "The Assembly of Small Interchangeable Parts," by John Calder.

Halcolm Ellis described the process of assembling the Ellis adding typewriter, followed by a paper by F. P. Cox on "The Quantity Manufacture of Small Devices."

Milling Cutters.

An able paper on "Milling Cutters and Their Efficiency," by A. L. DeLeeuw, called attention to the fact that better results can be had from milling cutters by increasing the tooth space and depth. A number of cutters constructed along these lines were tested and it was found that they have a number of points in their favor, among which are less consumption of power, a greater amount of work done for one sharpening and a greater number of possible sharpenings per cutter. A change in the form of chip breaker made it possible to use cutters with chip breakers for finishing, as well as for roughing.

A number of diagrams are presented showing the relative efficiency of different styles of mills for removing a given amount of metal.

John Parker, in a written discussion, admitted that the power consumption of cutters with wide spaced teeth is much less than that absorbed by standard cutters, but claimed that the excessive hammering due to the relatively few teeth is very detrimental in many cases. The new cutters occasionally push the work bodily out of the vise, and end mills of this design are inclined to work loose in their sockets. He gave details of a large number of tests of both types of cutters on cast iron and steel which showed a saving in power in favor of the new tool of from 14 to 20 per cent. Mr. DeLeeuw's statements regarding the tendency of standard cutters to clog with chips were disputed and tests were mentioned where standard cutters under a feed of 10 inches per minute cutting 0.4 inches deep did not clog.

A. F. Murray agreed with Mr. DeLeeuw's conclusions regarding the possibilities of the new cutter and described several heavy face mill cutters with inserted teeth designed on this principle. He also described some end mill cutters with only six or eight teeth. W. S. Huson said he favored the use of wide spaced teeth on surface mills but had not found this type successful in slot milling or gear cutting. He favored the use of cutters with a large number of teeth for accurate gear cutting, although they are more expensive to keep in good order.

Mr. DeLeeuw, in concluding, said he did not recommend the new cutters in a sweeping manner or that all existing cutters should be replaced by the new type, but did believe firmly that cutters with a few, rugged, wide spaced teeth are better in many cases than the standard design.

Gas Power Section.

The gas power section held a meeting simultaneously with the machine shop section Wednesday evening, R. H. Fernald, presiding. The report of the installations committee was read by George A. Orrok. E. A. Maccoun, in discussion, first drew attention to the characteristics of the card of the four-cycle engine, particularly the high initial pressure, 300 pounds or more, and the low mean effective pressure, 65 pounds. If it should prove that some new cycle is developed for slow combustion, engines will not have to be designed for such high maximum pres-

sures in proportion to comparatively low mean effective pressures. At the Edgar Thomson steel works, one blowing engine has operated 93 per cent of the time during an entire year. The speaker next mentioned some of the changes which were necessary to make their engines operate satisfactorily, since they must run nearly continuously to be economical. All troubles in cylinder design have not yet been overcome. He favored steel castings because they allow thinner walls. The cylinders should be in halves and bushed so that the lining may be easily renewed. He considers 44 inches about the minimum diameter for cylinders. For pistons, he stated that cast steel is used the most and that the pistons should be made in parts. A design approaching a sphere gives enormous strength and allows more expansion. The piston should float, so that it causes no pressure on the walls of the cylinder except that due to the rings. Piston rods were first made of nickel steel, but open-hearth steel is considered more satisfactory. The cooling water should be introduced and taken out through the ends of the rods, as holes through the sides make excellent starting points for cracks.

Experiences Related.

R. H. Stevens related the experience at the Carrie furnaces with four blowing and five electric engines. In the cleaning plant there are six units. Over 99 per cent efficiency is obtained in the cleaning, only 0.003 grain of dust per cubic foot remaining in the gas. The gas has from 85 to 90 B. T. U. per cubic foot thermal value.

A. N. Diehl introduced his remarks by contrasting the thermal values of fuels used in internal combustion engines, which range from 1,000 B. T. U. for natural gas to 175 B. T. U. for producer gas and 90 B. T. U. for blast furnace gas.

The last is ideal for gas engine operation on account of the slow flame propagation, permitting high compression. He described the nature and characteristics of the gas obtained and the cleaning apparatus used. It was found that they got the best results with spraying in the scrubbers. A study of the course of the gas in the scrubber led to the design of a spraying device to prevent channeling of the gas.

A. L. Hoerr described the installation at National Tube Works, McKeesport, and its history. Some of the changes made in their engines were as follows: The piston cooling water system had telescopic joints substituted for swinging joints; the design of the spark plugs was changed to use a rotary instead of a reciprocating motion; the gearing on the lay shaft was changed from spiral to spur type; the connections betwen the exhaust valves and the mufflers were equipped with expansion joints; the design of the keepers was changed and also that of the piston rod packing rings and a slight change was made in the exhaust chambers.

Difficult to Reconcile.

H. J. Freyn found it difficult to reconcile the remarks of the previous speakers and their apparent doubting that gas engines are as good as steam engines when they all reported engines operating as much as 95 and 98 per cent of the running time. No prime movers, he stated, could do much better. At Gary recently one quarter of 1 per cent was all the delay charged against gas engines. While in Europe last year Mr. Freyn noted with surprise the excellent running of gas engines and believes that we can do as well. He pointed out that most of the installations referred to by previous speakers were made some time ago and in most cases were practically their builders' first attempts. He contrasted with these the Snow engines at South Chicago and some other recent products, as examples of what can now be done in this country. Our need, as he sees it, is rather better workmanship than better design. He considers that foundry practice is better abroad and the reason why they have fewer cracked cylinders. Foreign builders have not adopted steel cylinders, and he thinks that cast iron cylinders are entirely suitable when properly made. The rod packing as used in this country he regards as better than that used abroad. He took exception to the figures circulated in this country as to the cost per kilowatt for gas engine installations as altogether too high. While a gas engine installation costs more than a steam turbine or steam engine installation the difference is not so great as commonly believed and he held is more than offset by the saving in operating expense.

U. S. Bureau of Mines Test.

The program of the evening was concluded by a paper by C. D. Smith, covering the work of the United States Bureau of Mines, Pittsburg Station, on the prevention of mine accidents and fuel tests. The paper was followed by lantern slide illustrations from photographs, illustrating some of the measures which are taken to safeguard mine employes.

Thursday Morning Session.

The Thursday morning session opened with a scholarly paper on "Stresses in Tubes" by Prof. Reid T. Stewart, showing that the stresses in the wall of a tube exposed to external fluid pressure are of the same character as those in a column having ends fixed in direction. Using the experimental results obtained by the author for the collapsing pressures of commercial steel tubing, 3 to 12 inches in diameter, he has derived equivalent column formulae upon the assumption that the circumferential stress in a tubular annulus subjected to external fluid pressure is theoretically the same as in a straight column, with fixed ends, whose length is one-half the mean circumference of the tubular annulus.

Prof. Stewart presented to the society a massive volume containing his original data, which was accepted with a vote of thanks.

In a paper on "The Purchase of Coal," Dwight T. Randall states that most boiler rooms are now conducted in a manner which permits of considerable saving along two lines: (a) the selection of a coal which is suited to the plant and at the same time is capable of delivering the greatest amount of heat to the boiler for a unit of cost; (b) burning the coal by approved methods to obtain the highest practical efficiency. The coals which are offered in almost any market vary in price and in quality to an extent which justifies a careful study of their character and heating value in order to determine which coal will prove most economical when the equipment, the load conditions and the price are considered. A coal which is entirely satisfactory in one plant may be unsuited to another. It is possible to burn almost any fuel with reasonably good efficiency provided the furnace is properly designed for the particular fuel to be burned. Coals which are suitable for any given equipment depend for their value principally upon the British thermal unit and the size of the coal. A thorough study of coals and the variations in their quality has naturally led to the purchase of coal under specifications with a guaranteed analysis, which provide for a definite procedure in case of a variation in the quality of coal delivered.

C. W. Rice pointed out the importance from a conservation stand-

point of designing power plants at the outset to burn low grade fuel which would otherwise go to waste. C. W. Baker seconded Mr. Rice's remarks and mentioned the use of steam blowers in burning low grade coal. Further discussion brought out the opinion that the coal producers must be made to assume more responsibility regarding the exact quality of the fuel which they sell. The proximate analysis, while valuable, should not be the sole basis for judging the quality of coal. Other factors must be considered, such as the tendency to clinker or fuse on the grate.

"Energy and Pressure Drop in Compound Steam Turbines" was the subject of a paper by Forrest E. Cardullo.

"The Pressure-Temperature Relations of Saturated Steam", by Lionel S. Marks was read by title.

Prof. Gardner C. Anthony presented a paper on a "Pressure-Recording Indicator for Punching Machinery".

This paper describes a new method for directly recording the stresses due to punching boiler plates under the working conditions of a boiler shop, by the use of an ordinary indicator. A number of cards taken from the indicator under the above conditions and also with the apparatus applied to an Olsen testing machine are illustrated and discussed. The testing machine was used for the purpose of checking certain results and introducing a variety of conditions which it is proposed to investigate.

Discussing this paper, Prof. R. C. Carpenter asked as to the effect of indicator leakage and consequent changes of pressure. He pointed out that the indicator working under the conditions described in the paper is apt to stick and that these factors may introduce errors. Julian Kennedy suggested that the die of the punch press be mounted on the middle of a steel bar, about 2 feet long, supported at the ends, and that the power required for punching be measured by observing the deflection of the bar.

Steel Works Session.

A discussion of steel works practice occupied the Friday morning session. In a paper on the "Commercial Application of the Turbine Turbo-Compressor," Richard H. Rice describes a compressor unit for blast furnace work consisting of a 4-stage Curtis steam trubine direct-connected to a 6-stage centrifugal compressor built and installed at Oxford Furnace, N. J., by the General Electric Co., and the first of this type to be made in this country. It is found that on account of the steadiness of operation and more uniform conditions, the output of the furnace has been increased and it is concluded that, considering all the factors, the centrifugal compressor as a blowing apparatus can be operated at a lower net cost than any other means for blowing furnaces. The paper contains data upon sizes and capacity of the apparatus, with diagrams showing the characteristics of its performance.

Prof. C. L. W. Trinks read an exhaustive paper on "Reciprocating Blast Furnace Blowing Engines," which is abstracted as follows:

The causes for the gradual change and progress in reciprocating blowing-engine practice were set forth; an elementary study of valve motion was given and the valve gears of present standard American practice were described. It is shown that these engines are very successful at the speeds for which they were designed, but that at higher speeds they cannot be used successfully, so that new designs had to be brought out in order to meet the pressing demand for higher speeds and lower first cost. Two American designs were described. It is shown that these valve systems, although much superior to the so-called standard gears when used for high speeds, have not yet broken with the idea that smallness of clearance is required for economy, whereas German builders have demonstrated that by the use of multi-ported plate valves large valve areas, and economy at high speed operation can be obtained in spite of large clearance. The foremost European types of plate valves were described and the results of tests were given.

It was pointed out that the bringing up of the piston speed of the blowing engine to the standard piston speed of the power gas engine or the power steam engine reduces the first cost of the reciprocating blower and that the combination of the high-speed blast-furnace gas engine with a high speed blower constitutes the most economical method for the production of furnace blast.

J. E. Johnston Jr. read a written discussion of Mr. Rice's paper in which he recommended the use of the reciprocating engine for expanding the steam from boiler pressure down to atmosphere in connection with a low pressure turbine direct coupled to a turbo-blower. C. J. Bacon divided the efficiency of the gas blowing engine into three parts, compression efficiency, volumetric and mechanical efficiency, the sum of these being the so-called shaft efficiency. He computed the shaft efficiency of a gas driven blowing engine at 75.8 per cent and of the turbo-blower at from 68 to 70 per cent. F. E. Cardullo suggested that the builders of blowing engines take a lesson from pump manufacturers and use smaller discharge valves.

H. J. Freyn believed the turbo-blower out of the question for steel works installation because of the small amount of surplus gas available with this type of apparatus. He pointed out an instance where with reciprocating, gas-driven blowers the surplus gas generated 32,800 kilowatts, while with turbo-blowers only 10,400 kilowatts could be generated. Julian Kennedy, assuming a 20 per cent depreciation for gas engine units, stated that there was no choice between the gas-driven and the steam turbine turbo-compressor. Mr. Freyn said 20 per cent was too high a figure for depreciation.

Steam-Hydraulic Forging Presses.

An interesting paper on "Power Forging, with Special Reference to Steam-Hydraulic Forging Presses", by Berthold Gerdau and George Mesta, concluded the meeting. Comparison is made between forgings produced by hammers and by presses with regard to quality. The particular fields for power hammers and presses are outlined. The effect of the blow of a hammer and the consumption of steam per working stroke are computed. The various types of presses are discussed with a view of determining their steam consumption under equal conditions. The most interesting features of various steam-hydraulic presses are illustrated.

In the discussion it was pointed out that forgings with convex ends can be made under a heavy steam hammer and that light hydraulic presses produce forgings with concave ends. The speed at which the forging is made has a great effect on the work required. In experiments on two 10,000-ton presses, making a certain forging in 50 seconds required 10,000 foot tons, in 32 seconds 6,500 foot tons were required, while in 7 seconds only 4,000 foot tons were necessary.

Entertainment Features.

Throughout the week the members thronged the exhibit of the Foundry & Machine Exhibition Co. at the Exposition buildings. In addition to the plant inspections mentioned, visits were made to the plants of the Westinghouse Electric & Mfg. Co., the National Tube Co., the Mesta Machine Co. and the Carnegie Steel Co. Thursday evening a reception and dance was given at the Hotel Schenley by the local committee and Friday evening the Engineers' Society of Western Pennsylvania gave a smoker. An extensive program of entertainment was provided for the ladies.

Judge Gary Testifies With Great Frankness

Giving House Committee Details of Tennessee Deal—Contradicts Gates—Favors Government Control of Corporations, Including Fixing of Prices

With directness of statement and frankness of detail, Chairman E. H. Gary, of the United States Steel Corporation, gave at Washington, Thursday and Friday, May 31 and June 1, to the Stanley congressional committee, a clear recital of the facts and conditions surrounding the acquisition of the Tennessee Coal, Iron & Railroad Co.; told fully of the difficulties imposed by the restrictions of the Sherman anti-trust act, upon the steel business in its efforts to maintain permanent stability, and outlined the present co-operative methods of steel manufacturers of this country in their efforts to find a common ground between the barriers of the law and the evils of destructive competition.

The statements of the leading executive officer of the United States Steel Corporation covering the progressive incidents in the final purchase of the stock of the Tennessee Coal, Iron & Railroad Co., furnished the climax of an examination extending over one and a half days. The inquiry delved deeply into a wide range of subjects, broadened into international importance in certain phases and became of widespread significance in the utterance of opinions as to the ultimate solution of the problems pertaining to the regulation and control of large industrial corporations.

Answers Institute Attack.

By his complete frankness in giving to the committee the part played by himself in the different matters inquired into and by his willingness to volunteer the furnishing of detailed information and records of the Steel Corporation's operation and organizations, Judge Gary made a very good impression upon the investigators. He contradicted strongly some of the statements made before the committee last week by John W. Gates in which the latter had given his belief that the sale of the Tennessee company stock was a "forced" transaction. He also minimized the part which Mr. Gates had taken directly in the final arrangement of the details of the transfer, although the latter had testified that he was the instrument in effecting several important alterations of the original purchase plan.

At the beginning of the Friday morning hearing, Judge Gary outlined at length the conditions leading to the present co-operative methods of steel makers and to the formation of the American Iron and Steel Institute, the motives of which had been questioned at the preceding session.

"With permission of the committee I shall state briefly what is involved in the whole matter, showing what has been done and what our intentions are," said Judge Gary. "The chairman inquired yesterday whether representatives of the press were admitted to the dinners, and I answered in the negative, except for the editors of three trade journals. There is always a chance for misunderstandings, unless the representatives are thoroughly conversant with the subject matter. For instance, it was published this morning that the witness admitted that the United States Steel Corporation was the dominant factor in the steel business of the country. It was admitted that the United States Steel Corporation was dominant over the subsidiary corporations.

"At the time of the organization of the Iron and Steel Institute in New York, there was a great general depression in business, and the fear existed that it would spread. The iron and steel industry has been recognized as one of the leading promoters of trade, and it was believed by many people of prominence that it would be important, if practical, to prevent a great demoralization of the steel trade. Moreover, many of the leading jobbers throughout the country were possessed of large quantities of material that they had purchased for resale, and if the prices were reduced, their commodities would be marked down, their loans called, and it was believed that there would be many failures and bankruptcies. Now, I need not suggest to the lawyers on this committee that the interpretation of the Sherman act has been more or less involved in doubt. Evidently the act was intended to prevent the existence of monopoly and restriction of trade. A company like the Steel Corporation, holding about 50 per cent of the available supply of ore, was confronted with a situation. It had no right to try to maintain the equilibrium of business and level prices, free from sudden and violent fluctuations, by the operation of any agreement. We had no lawful right to make any agreement with our competitors to maintain prices, notwithstanding we were receiving letters every day begging us to prevent the marking down of prices that would drive them into bankruptcy. We believed we had no moral or legal right to become involved in a bitter and destructive competition, such as used to follow any kind of depression in business among iron and steel manufacturers, although it meant a war of the survival of the fittest, if a large percentage of the people in the manufacture of steel were forced into bankruptcy, because their facilities were not so good, they could not produce so cheaply, their lack of capital, their decreased ownership of raw products, and thus were placed at a disadvantage; therefore, it was believed (by me, at least) that it was not for the best interests of the manufacturers, the consumers, or employes throughout the country. A wide, strong, extreme lowering of prices meant reduction of wages. Reductions were talked of in 1907, and we went through the panic without any wage reduction, although our competitors, many of them, did reduce wages.

Has Prevented Demoralization.

"Now, the question was, how to get rid of competition without driving out our competitors, or making any agreement which would result in the maintenance of prices. And so I invited a large percentage of the steel interests of the country to meet me at dinner, and then presented these views to them, and—so far as I could—the result of our being demoralized by the extreme decrease of prices under the old regime. I suggested that the only way this could be done, and maintain a reasonable degree of steadiness in business, whether we lowered the prices from time to time or not, was for the steel people to come together occasionally and tell, one to the others, exactly what their condition was—in other words, a disclosure of each one to the others, of all the circumstances surrounding his particular business.

"We never have controlled the prices and never can; but we have, by this interchange of opinion, and experience, prevented the demoralization

that was threatened. Only last week one of the smaller manufacturers made certain cuts, and of course some of the others had to follow. Whether it was wise, I do not know. I never have stood for unchanged prices. I believe they should not be above a fair price."

"You believe that prices should change through the common consent and common concurrence of the men most interested?" asked Mr. Stanley.

"No, I do not believe in changing by common consent; but I do believe that when one individual is possessed of information surrounding the others' business, it prevents, many times and in many cases, uncertain and bitter competition," answered Judge Gary. *"I think it prevents an increase* in prices. It has been the aim of the Steel Corporation to prevent strong and material increase of prices. The old plan was to keep mills running all the time whether they made a profit or not, and that by making various concessions. On the other hand, when goods were scarce, they took advantage of that and put prices up as high as they would stand. I do not think this method for the best interests of the country, the consumer, the employe or the general business conditions. Stability is the thing that is needed."

Mr. Stanley: "This obstinate hostility of the consumer to a reduction of prices surprises me; I thought I must have misapprehended you."

"I think that any of us would rather have the prices of our neighbor uniform than to have them very low in the time of depression and then very high. What the consumer wants is stability of prices. A man putting up a building, finds steel is $30 per ton, and he pays this, unless he thinks that next week some other man can go and get it 30 per cent cheaper and compete with him in erecting a cheaper building and renting it for less.

Foresees Federal Price Control.

"I said here two or three years ago, before a congressional committee, it is very important to consider how the people shall be protected against imposition and oppression as the result of great aggregations of capital, whether by corporations or individuals. Personally, I believe the Sherman act does not meet and never will fully meet that. We must come to publicity and *governmental control* of prices; and, speaking for our company, so far as I have the right, I would be very glad if we knew where we could stand; if we could be free from danger, trouble and criticism from the public—if we could go somewhere to governmental authority and say, 'Here is what we have, our material, our plant, our standing, our facilities, you tell us what to charge.' But, from the standpoint of making the most money, whether or not it is the wise thing, I believe it is the necessary thing."

"Is it your position that co-operation is bound to take the place of competition?" asked a member of the committee.

"Yes," said Judge Gary.

"And that the Sherman law, interpreted recently by the supreme court, shows it to be an archaic law and that it means a continuance of the oldtime warfare of competition?"

"I fear it is. We do not want to be groping around," said the witness.

"Do you think the national government, under the constitution, would have the right to say what prices should be charged in interstate business?" was asked.

"It is my opinion that, so far as it relates to interstate commerce, the federal government has that right. It is a part of what is a well recognized and well settled principle," answered Judge Gary.

"Is your corporation now in a position where it can maintain stability?" asked the committee.

"No, far from it," replied Judge Gary. "It is the small companies that break the stability of the market, and when they cut prices the others must follow, or there will be complaint on the part of their customers. It is a mistake to say that we can dominate the business, but it is not a mistake to say that our Corporation has had an influence in creating stability."

Continuing in his statement as to the efforts of steel makers to maintain stability, Judge Gary said, "These meetings, to which I have referred, led to the organization of the American Iron and Steel Institute, covering many subjects, including the welfare of our men. Addresses delivered at the meetings are in print, and from them it will be seen that welfare of the men was the principal subject, in addition to improvements in methods and other questions. Last fall the American Iron and Steel Institute invited several foreign manufacturers, and they spent a week or ten days with us. Everything that took place was printed, and it was suggested that we have an international association, with the same general scope; and a meeting has been called for July 5-6 at Brussels; gentlemen from all over the world will be there, and it will be suggested that an association be formed along these lines, unless it should appear to me and others that we should not do it, from a legal standpoint or a moral standpoint. I shall not be put in the position of allowing it to be said that I intended to violate the law or to oppose the best interests of the country."

Hints at Plate Pool.

Mr. Stanley: "This proposed institute is similar to a like concern that, I think, was international, in the matter of armor plate?"

Judge Gary: "I do not know to what you refer."

Mr. Stanley: "Well, the secretaries of the navy have complained that there was an organization that prevented the hateful demoralization of prices."

Judge Gary: "I do not know to what you refer. I would not want to admit that there is such an organization in existence. There is a British association, that considers ethical and sociological matters, which are now regarded as important as making money. I think the chairman is mistaken about it."

Mr. Stanley: "You spoke of the amount of the control of ore; did not the United States Steel Corporation, Dec. 8, 1898, have a control of the supply of ore?"

Judge Gary: "No, it was not an absolute control. When I made a statement on that subject once before, I did not have any figures before me, or at that time I believed that the United States Steel Corporation interests had control of something like 65 or 70 per cent of the best ores of the northwest, and I believed that the ores which others had would be exhausted before the ores in control of the United States Steel Corporation; then the time would come when they would be in possession of these ores while others would be compelled to use what at the present are not merchantable ores."

Speaking on the stable price of steel rails, which has continued at $28 mill for Bessemer rails for ten years, Judge Gary declared that he thought an increase will be necessary because of the greater cost. "The original price of rails at $28 was fixed as the result of a conference but it was a reduction from $33 to $28," he said. "We have been unwilling since to increase the price, although there have been conditions that would justify us, and some of our competitors have done so; but we have declined to do so. We can put prices down, but

not up. There has been no effort to put the price below $28. We sell to roads that are apparently satisfied. The Pennsylvania railroad has an interest in rail-producing concerns, but it buys from us. If we had prices too high we would have heard from them, just as they would have heard from us if we thought their freight rates were too high. The cost of steel rails is about $22.60; it costs to build a rail mill about $35,000,000—we know because we have just built one at Gary, Ind. Wear and tear and the interest on the investment do not leave much profit, when you remember that many of these mills are not running full all the time, which materially increases the cost of production."

Tells of "Dump Sales."

In reply to a question as to "dump sales" Judge Gary said: "There is a practice all over the world of dumping surplus product. It is for the same reason that the merchant at some seasons bares his shelves and sells what he has on hand at less than cost. Now if we could sell our rails abroad at $26 per ton, or at about cost, all the time, so that we could keep our mills full all the time, (1) we would reduce the average of general cost of production (2) we would keep our money in continuous employment, and (3) bring from foreign countries large sums of money. We do sell for export something less than the domestic price; as a result, we can sell for domestic consumption at a lower price. In 1905-6, I believe, there were large quantities of foreign rails shipped to this country; and I think there were some Belgian rails sold on the Pacific coast during the last year. Rails have been sold in South America as cheaply as in the United States. We do not sell to all foreign countries at the same price. I shall try to furnish the committee with a list of the prices at which rails were sold to foreign consumers, and the quantities sold."

In reply to a question, Judge Gary said that the idea of finding a middle course between the Sherman act and destructive competition would be discussed at the Brussels conference and that "he wished he knew how this could be done."

Tells of Tennessee Deal.

Judge Gary told the story of the Tennessee deal in his own way, going into the minutest detail and with but very little questioning from the committee. He said the stock of the Tennessee Coal, Iron & Railroad Co. was offered to the Steel Corporation at different times in one way or another, but that he or other members of the finance committee of the Corporation had opposed taking the property on any basis. Asked whether the Corporation had solicited the property on its final purchase, the witness said it had not, but that on this occasion the stock was offered by Attorney Lewis Cass Ledyard, representing Col. Oliver Payne, who was associated with Mr. Schley, of Moore & Schley, in "the Tennessee" stock pool.

"Finally in 1907," said Judge Gary, "Mr. Morgan sent for me and said that Geo. Kessler, who owned some of the Tennessee stock, apart from that held by the syndicate, had informed him the stock could be bought at 130. He asked my opinion and I told him I did not consider the stock worth more than half that figure. I said I would like to consult with Mr. Frick, which I did, and he was of practically the same opinion. The matter was then dropped. Afterwards Mr. Morgan said he learned that Mr. Kessler represented only himself and not the members of the syndicate, as at the time he had supposed.

"On Oct. 23, 1907, Mr. Morgan called me to the bank and said that Mr. Schley was very much in need of money and securities which he could use at the bank. This finally resulted in my accommodating Mr. Schley by loaning him $1,200,000 par value of our second bonds and took from him as security for the return of the bonds $2,000,000 par value of Tennessee stock. The agreement provided that, if the bonds were not returned by Oct. 23, 1908, that stock should remain in the Corporation. This loan was made at Mr. Schley's request because he stated that it was absolutely necessary to protect him from financial trouble. It was the same as taking Tennessee stock on the basis of 60. I have a written agreement between the Corporation and Moore & Schley, and in view of the circumstances and Mr. Schley's previous statements of this transaction, I feel justified in submitting a copy of this agreement to the committee." Judge Gary then submitted a copy of the agreement.

Gary Describes Panic.

"The next step in the purchase," continued the witness, "was about Nov. 2, 1907. We were then in the midst of what I have called a financial cyclone. Runs were being made upon the Trust Co. of America, the Lincoln Trust Co. and other New York banks. The panic had extended over the entire country. Chicago banks had drawn their funds from the New York banks and other banks were collecting in their moneys. It was impossible for depositors to get their money or for business men to get loans and loans were being called in the leading cities."

As an illustration, Judge Gary told how the vice president of one New York bank had applied to the Morgan house for a loan of a million, which he said the institution must have that day or be obliged to close. The Morgan bank, being overwhelmed with such requests, had asked Judge Gary to examine the assets of the bank and he had done so, employing the officers of the Steel Corporation in an all-night work of checking over the securities of the institution so that upon his recommendation the loan was made. On one occasion, the witness said, he was present at an all-night meeting of a number of the leading bankers of the country, held in Mr. Morgan's library in New York, at which there was every indication that the country was in the throes of a panic, which might lead to the suspension of a number of banks and the failure of many persons.

"There is no doubt that the country was in danger of one of the worst financial panics in history," said Judge Gary.

Morgan Refers to Gary.

"Mr. Morgan had called me to his library, where I found Mr. Ledyard, representing Mr. Payne, and, I think, Mr. Schley. Mr. Ledyard stated that Mr. Schley was in very great financial distress; that he was largely indebted to Mr. Payne and had securities of the latter; that he had deposited a large amount of Tennessee stock as collateral security with a good many New York banks. These institutions were insisting upon Moore & Schley taking up the stock for the reason that it was not saleable."

Interrupted at this point, Judge Gary said the Trust Company of America had about $400,000 of this stock and that the total amount scattered among the different New York banks by Moore & Schley was about $6,000,000.

"Ledyard said, in his opinion, there was no possible way to prevent the failure of Moore & Schley unless we bought the Tennessee stock, and that he believed that if Moore & Schley failed, it would mean the failure of a good many banks. Mr. Morgan said to me he did not know whether the Steel Corporation could afford to buy the stock. He did not express an opinion upon this subject, but he did say, 'I will say, however, that unless it (the Corporation) or someone else furnishes relief, no one on earth can tell what the result will be in the financial circles of this country. If you can see your way to buy the stock, no doubt it

will help the situation. I shall turn Mr. Ledyard over to you.'

"I told Mr. Morgan that I would not consider the purchasing of this stock without taking up the matter with the president or the department of justice. I said that since the purpose of this purchase was to prevent a crisis and to allay fears, that if the department of justice, upon learning of the stock purchase, would enjoin us or raise the question of monopoly control, this would cause a condition which would defeat what we proposed to do. Mr. Morgan said he thought this was very forcible. I then telephoned Mr. Frick to come to the library, explained the matter to him and asked him if he would go to Washington. Mr. Frick said he thought the first question to be decided was whether we wanted the stock. I had said to Mr. Ledyard that I did not consider the stock to be worth over 65, and Mr. Frick was of the same opinion.

An Offer to Loan.

"A meeting of the finance committee of the Steel Corporation was called at the library and the situation was gone over very carefully. A resolution was offered by Mr. Frick, I think, which referred the subject matter to the chairman with power and it was understood that we would offer to loan Mr. Schley between $5,000,000 and $6,000,000, taking Tennessee shares as security. If that failed to satisfy his wants, we would then buy the stock at 90 by giving bonds of the Corporation. This proposition was made to Mr. Ledyard, but he said it would not do, as he stated Mr. Payne and others had offered to loan Mr. Schley perhaps $8,000,000 or $9,000,000, but the latter had said that this would not be enough. Mr. Schley was represented by Attorney Tom Thatcher in these negotiations, and if I am not mistaken, I believe the latter would say that a deed of assignment for either Mr. Schley or Moore & Schley had already been drawn at this time. I say this because I understand Mr. Schley has said that he could have gotten through the crisis all right without our help.

"We then talked to Mr. Ledyard on the proposition of taking the stock with bonds on the basis of 90, subject to any objections that might be raised at Washington. The bonds were then quoted at 74. The Steel Corporation then had in banks in different cities about $75,000,000 in cash. We would have been pleased to pay cash for the stock except we could not do that without seriously disturbing the financial conditions of the country, as about $25,000,000 was needed in the deal. Therefore we decided to pay for the Tennessee stock in bonds in our treasury, because they were as good as cash and had a ready market. The only reason we subsequently increased our offer from 90 to 100 was because the stock at 90 was not sufficient for Moore & Schley to pull through. Another meeting of the finance committee was held; a second resolution passed, authorizing the chairman to raise the price from 90 to 100. My negotiations were wholly with Mr. Ledyard. Mr. Morgan did not participate and did not attempt to influence anybody to buy or sell. I hold no brief from Mr. Morgan, but I make this plain, because of the misstatements on this point, based on misinformation, which have been made.

"Most of the gentlemen participating in the Tennessee stock syndicate were not obligated in Moore & Schley's loans, but, as I understand it, they were very glad to turn in their stock at this figure. I suspect members of the syndicate, though they were not in debt, said to Mr. Schley that since under the syndicate agreement, he could not sell at a loss, they would not let him do so unless he included their stock.

"The meeting of the finance committee continued late Sunday night, up to about 10 o'clock. I then called up the private secretary of President Roosevelt and asked for an early appointment the next morning. We were informed that the president would see us the next morning at 10 o'clock. Mr. Frick and I secured a special train and came to Washington. Though we arrived early, we went immediately to the executive offices to see if perhaps the president could not see us even before an appointment. We reached there about 9 o'clock, told our business to the secretary and were informed that the president was at breakfast. We asked him that in view of the importance of our mission, if the president would not make an exception in our case and see us at once. The secretary returned in a few minutes with the president. We explained our mission and the president said he would like to consult with the department of justice. Mr. Bonaparte was away and the president then asked Secretary of State Root to come to the executive offices. The president asked me to again state the case before Secretary Root. The president asked the latter as to the validity of the transaction and there was no disagreement between us. I immediately telephoned the result of the interview to New York, as the secretary had held the phone open for us."

Judge Gary then submitted in evidence to the committee a record of his interview with President Roosevelt and Secretary Root, which was in the form of letters between Judge Gary and Secretary Root and Secretary Root and the president, which passed within a few days after the call upon the president. In these, the president's position was established as saying that while he would not or could not give legal consent to the transfer, he saw no objection to it under the circumstances. Judge Gary in his letter to Secretary Root had confirmed his statement to the president in the White House interview that the acquisition of the Tennessee company would not increase the Steel Corporation's holdings to more than 60 per cent of the total steel output of the country, which was about the capacity of the combined companies of the Corporation at its formation. Judge Gary had told the president that the Steel Corporation was opposed to securing a monopoly in its line or of materially increasing its production. The record of the letters submitted by Judge Gary to the committee is the first time the accurate documents as to what passed at the interview with the president in the Tennessee deal have ever been made public.

Regrets Stanley's Attitude.

After expanding on several points as to President Roosevelt's statements at the conference, Judge Gary expressed his regret that Chairman Stanley of the committee, by his statements in support of his resolution for an investigation, had shown that he believed the president had been deceived by himself and Mr. Frick as to the facts surrounding the purchase of the Tennessee Company stock.

"I should have said perhaps, unintentionally misleading," said Chairman Stanley with some show of sarcasm.

"I believe everyone connected with the United States Steel Corporation cares more for his conduct, business reputation and character, than he does for the question of making or losing a few dollars," retorted Judge Gary with emphasis.

Some figures on the position of the Tennessee Coal, Iron & Railroad Co., before and after it was acquired by the Steel Corporation, were given by Judge Gary. In the three years preceding its purchase, it earned an average of 4.8 per cent on its entire investment; since its acquirement it has earned 4.5 per cent, and this in the face of the fact that $23,000,000 of additional plant capital has been put in, one-half of which was done by the Steel Corporation since 1907. For the year 1907, the company's average cost of producing rails was $29.48 per ton and its sales price $28.76; pig iron, $11.02 cost and $16.49 selling price; steel bars, $36.42 cost and $37.90 selling price; steel plates, $38.13 cost and $40.08 selling price; and billets, $24.67 cost and over $33 selling price. But 2,500 tons of billets were sold that year and the plate

and bar sales were comparatively moderate. Rails were the principal product. The company produced about 2 per cent of the steel of the country and the Steel Corporation 56 per cent.

In several important particulars, Judge Gary flatly contradicted statements regarding the purchase of the Tennessee stock, which were given to the house committee last week by John W. Gates.

"I remember Mr. Gates said he had compelled that we treat the minority stockholders of Tennessee stock the same as the majority. I have no recollection of any such occurrence. The original memorandum provided that we take the minority holders on the same basis. The whole deal was consummated before Mr. Gates returned to this country."

At another time, Judge Gary, referring to Mr. Gates' statement that he caused the original offer of the Steel Corporation for the Tennessee stock to be rejected because it was not enough, said: "If Mr. Gates made such a statement during the negotiation, he must have made it by Marconi, as he was not in the country, and the whole transaction was closed before he returned from Europe—at least such a statement was not made to us. The only reason why we increased the price is because the stock at 90 was not sufficient for Moore & Schley to pull through."

Asked by Mr. Gardner why some one besides the Steel Corporation did not come to the rescue of the Tennessee company, Judge Gary said there was no other customer for the stock and if it had been put on the market, it would have gone very low.

"I believe that the company would have been in bankruptcy in a short time," said Judge Gary.

Stanley Feared World Trust.

In the course of the Thursday morning session, which was ended at noon because of the Democratic party caucus, Chairman Stanley stated that one of the main causes which had moved him to introduce his resolution for an investigation of the Steel Corporation was a fear that an organization of steel makers of the world was about to be formed, which by international trade agreements could nullify in effect tariff and other legislation in this and other countries. He referred to Judge Gary an editorial in the issue of May 13, 1911, of an English iron paper, stating that the real purpose behind the formation of a world-wide institute of steel makers was to make international trade agreements to regulate prices, and charging that the progress of such a movement was due especially to the activity of the chairman of the United States Steel Corporation as president of the American Iron and Steel Institute. Judge Gary was furnished a copy of this editorial for reply, which he made later.

Judge Gary stated that he thoroughly appreciated the spirit of frankness on the part of the chairman of the committee and that it would be met in exactly the same manner. He said he would gladly place all the facts at the disposal of the committee, adding to Mr. Stanley: "I only wish you had come to me before introducing the resolution, for I am sure I could have convinced you that you have been laboring under a misapprehension as to the real purposes of the American Iron and Steel Institute and as to the dangers involved."

Inquiries of Steel Institute.

This turn of the testimony had been directed by Chairman Stanley through his inquiry into the nature and purposes of the American Iron and Steel Institute. Judge Gary informed him that this was an organization of individual iron and steel manufacturers of this country. He said its purpose was "to collect and disseminate information concerning the economic and ethical questions applicable to and in which, iron and steel makers are interested." Judge Gary stated the institute was not international scope and added that he was willing to tell the committee what he advocated and was trying to do, to extend the purposes of the organization so as to embrace steel makers of other countries. He offered to place at the committee's disposal copies of the constitution and by-laws, lists of officers and members, and copies of the addresses delivered at the meeting, and any other information desired concerning the American Iron and Steel Institute.

Referring to the so-called Gary dinners, the chairman inquired if the suggestion made to the effect that at these affairs efforts were made for the control and regulation of the prices of those commodities in which those present were interested.

"I assure you that the contrary is true," answered Judge Gary.

Asked further regarding these dinners, Judge Gary said that the representatives of the newspapers were not admitted, but that the editors of the leading trade papers of the country were invited. Pressed as to what he regarded as the leading trade papers of the country, Judge Gary named THE IRON TRADE REVIEW, *The Iron Age* and *The Manufacturers' Record* as those referred to.

Considerable politics was apparent at one junction of the session. Judge Gary had referred to the investigation of the books of the Steel Corporation, which has been under way for the past six years by the bureau of corporations of the department of commerce and labor.

"Has the department of commerce and labor been closely looking into the affairs of the Steel Corporation all these years?" asked Congressman Stanley.

"They have," answered Mr. Gary.

"Do you know whether the information has been filed with the present president or an ex-president?" the chairman inquired.

Though his counsel interposed some objection to this form of question, Judge Gary said: "I have no objection to stating all I know. I have no knowledge as to whether or not the department of commerce has filed any of its information with the president." He added that the report was not yet complete, but would be in a few months, as he sincerely hoped, since it had been an arduous task and had required the expenditure of many thousands of dollars on the part of the Corporation. He declared he did know, however, that when he appeared before the committee on ways and means, several years ago, that body had considerable information at its disposal from the department of commerce and labor, relating to the costs and other manufacturing data concerning the Steel Corporation.

Judge Gary denied ever having made a newspaper statement attributed to him, or words to that effect, that Attorney-General Wickersham had already investigated the Corporation and had given it a "clean bill of health". "I couldn't in truth make such a statement," said the witness.

Corporation Dominates Subsidiaries.

Much of the time of the opening examination of Judge Gary was given over to the establishment of details of organization, capitalization and mode of operation of the different subsidiaries and the Steel Corporation itself. Asked whether the subsidiaries manufacturing the same classes of products competed in any way, he said that they did to some extent, and added: "Yet I want to be perfectly frank with you, so that you may put your own construction upon things. Undoubtedly the subsidiary companies of the United States Steel Corporation are influenced and ultimately controlled by the Corporation because it is the owner of their stocks. Of course, the subsidiary companies, having their own boards of directors and officers from president down, have the right to act independently of the United States Steel Corporation, but inasmuch as the latter is the owner of the securities, you can see that, if conditions of subsidiary companies are antagonistic or inimical, it would only be a question

of time before the directors were changed."

Details concerning the terms of transfer of the different subsidiaries into the Steel Corporation and of their operation at that time, most of which have long been public property, were gone over. Judge Gary said that the Carnegie interests received for their properties in Corporation securities, $303,450,000 in bonds, $98,277,100 in preferred stock, and $90,279,040 in common stock. He said at the time of its being taken over by the Corporation the American Steel & Wire Co. controlled 77 per cent of the wire rod and 68 per cent of the wire nail business of the country. The Tennessee Coal, Iron & Railroad Co. now owes the Steel Corporation a little over $10,000,000 for money advanced, which has never been capitalized.

Adjourns to Wednesday.

The hearing of the committee adjourned Friday night until Wednesday morning, June 7, when it was expected Judge Gary would finish his testimony. The committee has arranged to try and question two of the remaining witnesses under summons on each day. These include former Vice Presidents W. B. Dickson and James Gayley, of the Corporation; Norman B. Ream and Percival Roberts, directors of the Steel Corporation, and John Lambert, director of the Republic Iron & Steel Co. Mr. Lambert is expected to be one of those to testify next Wednesday. Chairman Stanley has denied that Ex-President Roosevelt is under summons to testify before the committee, and has declined to tell of those not yet officially called, who will appear at subsequent hearings.

To fill the vacancy on the committee, caused by the resignation of Congressman Martin E. Olmsted, of Pennsylvania, Congressman A. P. Gardner, of Massachusetts, has been named and sat with the committee for the first time Friday.

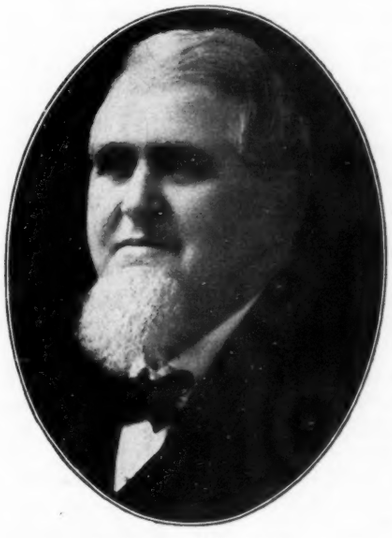
Canadian Locomotive Works Sold

The Canadian Locomotive Works Co., Ltd., of Kingston, Ont., has been sold to a syndicate of English capitalists, which is understood to include Lord Glenconner, Marlborough Prior, J. Leigh Wood and F. R. S. Balfour, who recently visited Kingston and inspected the plant. The price has not been announced. The company will be reorganized, the capital increased from $500,000 to $5,000,000 and the works doubled in capacity.

Death of John J. Spearman

John J. Spearman, who died at his home at Sharon, May 31, was the oldest iron master in the country. The discovery of iron ore in the Lake Superior country may be said to have given the iron trade of the United States its great impetus, but Mr. Spearman had been active as an iron maker for many years before these deposits were discovered. It might be said that he had been continuously a part of the great iron business of the United States from its very beginning.

It was Mr. Spearman who settled the controversy as to which was the first furnace to work Lake Superior ore in the Shenango valley. The first Lake Superior ore worked in the Shenango valley was at the old



JOHN J. SPEARMAN

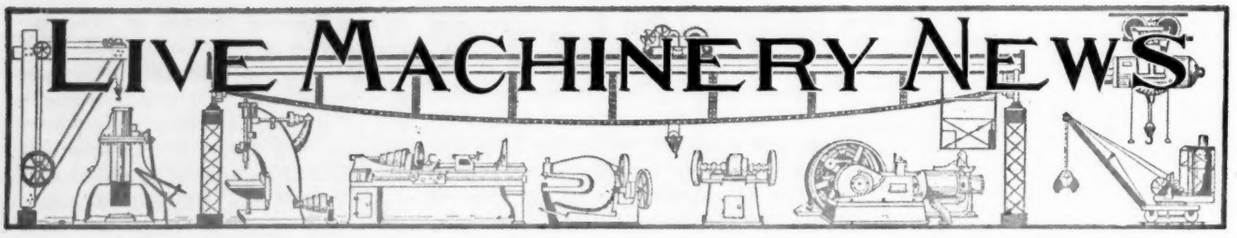
Sharpsville furnace in 1853, though only a small quantity was used in a mixture of native ores. The first Lake Superior ore worked alone was at the Clay furnace in 1856. The old Clay furnace was long since abandoned.

Mr. Spearman was born at McKee's Gap, located about eight miles from Hollidaysburg, Bedford county, Pa., Dec. 27, 1824. He began work at the age of 11 years, manipulating a leather blacksmith's bellows which forced air into the shaft for miners working at the Hopewell iron mine in Bedford county. From bellows boy he was promoted to the position of driver of a horse and cart. He left the furnace business at the age of 15 and entered a general country store, returning two years later to Dr. Peter Schoenenberger's employ at the Sarah furnace. In the spring of 1842, he was employed in the Rebecca furnace in Huntington county as book-keeper and head clerk, remaining until 1845. He was then transferred by Dr. Schoenenberger to the Maria forges as assistant manager. In 1847, Dr. Schoenenberger acquired an interest in the Sharon furnace at Sharon, Pa., and Spearman, who was then 23 years old, was transferred there as assistant manager. In 1852, he bought the Mazeppa furnace on his own account and operated it until 1859, when he accepted the position of manager of the Sharpsville furnace. In 1862 Mr. Spearman entered the employ of James Wood & Sons, Wheatland, Pa., and was admitted to partnership during the following year. He sold his interest out in 1870 and in the fall of 1871 organized the Spearman Iron Co. This plant was sold to W. P. Snyder, Pittsburg, in 1901. Meanwhile Mr. Spearman's activities had led him into other ventures, notably the organization of the First National Bank of Sharon, of which he was president for 39 years and which office he was actively filling at the time of his death. Mr. Spearman's memory remained clear until the end and he was a perfect mine of information regarding the early days of the iron trade.

Sprague Electric Taken Over by General Electric

The Sprague Electric Co. was merged with the General Electric Co., of Schenectady, N. Y., June 1. Its business will be continued under the name Sprague Electric Works of the General Electric Co. The manufacture and sale of the lines of apparatus and supplies heretofore exploited by the Sprague Electric Co. will be continued by the Sprague Electric Works of the General Electric Co. under the same organization, with D. C. Durland in responsible charge as general manager, and with the assurance that the characteristic high quality of product and efficiency of service to its customers will be maintained.

All correspondence should be sent to the Sprague Electric Works at the same address as in the past. Bills and statements will be rendered from the Sprague Electric Works, No. 527 West Thirty-fourth street, New York, N. Y., to which all remittances should be made. The offices of the Sprague Electric Works will be continued as heretofore, with main offices at 527-531 West Thirty-fourth street, New York, N. Y., and branch offices in principal cities.



In New York, considerable contractor's machinery and equipment has been bought during the past week as a result of the letting of the contract for the Catskill deep pressure tunnel. No other new business of importance has appeared lately in that market. In Pittsburg, actual bookings in May were very light and prospects for the early part of June are not encouraging. On the little business that has presented itself recently, competition was very keen and low prices were generally quoted. It is expected by Pittsburg dealers that the railroads will place some orders for tools after the taking of inventories at the close of the fiscal year, June 30. In Cleveland, the only event of importance scheduled for the near future is the appearance of a large list of machine tools for the proposed new technical high school. This list will be submitted very shortly. In Chicago, no change is reported. On the Pacific coast, a number of companies are making enlargements and business in power equipment is fairly active.

Railroads

The Santa Fe Railroad Co. is planning extensive yards to be built at Fresno, Cal. An extensive machine shop is among the improvements.

Plans have been filed by the New York, New Haven & Hartford Railroad Co. for a two-story, brick warehouse 1,021 x 437 feet, to be erected at the Harlem River yards. The estimated cost is $100,000.

The Morgantown & Kingwood Railroad Co. is building new railroad shops at Morgantown, W. Va. A contract for the building, to cost $40,000, has been awarded to W. Trimble & Sons, Pittsburg. Contracts for tools and equipment will be awarded later.

Machine Tools

The Henry Vogt Machine Co., Louisville, Ky., is planning to build an addition to the erecting department of its boiler shops. Equipment for this will be decided on later. The company has decided to buy two or three steam drop forge hammers instead of one, as recently announced. One of them will have a capacity of 2,000 pounds.

The Electric Vehicle Co., Louisville, Ky., capitalized at $10,000, has leased a building at Preston and College streets, that city. Louis Ruthenberg is superintendent. Most of the machinery has been purchased, but as it is the intention to increase the capacity gradually, the company will be in the market later for machine tools and other equipment.

The Porceliron Stove Co., Beaver Falls, Pa., advises that it will manufacture gas stoves, ranges and specialties. It will be in the market for motors, drill presses, grinding and polishing machinery and other tools, although the complete list has not yet been made up. In about 90 days the company expects to be in the market for valves, stove trimmings, etc., in large quantities.

Water Works

Fred Biggs, Willard, New Mex., will install a pumping plant for irrigation purposes.

H. M. Maus, Fair Oaks, Cal., will install a pumping plant to irrigate 160 acres of land.

Las Cruces, New Mex., has voted $75,000 worth of bonds for a municipal water system.

Director of Public Works Joseph G. Armstrong, Pittsburg, is taking bids on equipment to be installed at the Aspinwall, Pa., pumping station, including six water tube boilers, six mechanical stokers, one economizer, coal bunker, coal and ash handling machinery and two 20,000,000-gallon pumping engines.

Foundries

A new foundry is being erected by the Skinner Engine Co., Erie, Pa., on the new site acquired recently, which will more than double the capacity of its present foundry.

James P. McCleary and Colin McInnes have leased the Wellsburg Foundry & Machine Co. plant, Wellsburg, W. Va., for a period of 10 years. It is understood that some improvements will be made.

H. H. Martin, formerly with Grainger & Co., Louisville, Ky., heads a company which is about to let contract for a gray iron foundry to be erected in Louisville. The new building will be 36x100 feet and will have a capacity of five tons per day.

The American Foundry & Machine Co., Hamilton, O., advises that it will let contract in about two weeks for a reinforced concrete foundry and pattern house. The foundry will be in addition to the present plant. It will be 100 x 118 feet and will be devoted to light bench work.

Power Plant Equipment

Bloomfield, N. J., is considering the installation of an electric light plant.

J. B. Hobson, Deeth, Nev., is at the head of a company which is planning to erect an electric lighting plant.

Newberry, Mich., will hold an election in the near future regarding a bond issue for erecting a power plant.

It is reported that Arbuckle Bros., New York, have plans under way for a power house, to be erected at the Brooklyn plant.

Alonzo Adams, Nevada City, Cal., is at the head of a company which is planning a large power plant on the Truckee river.

Libby, Mont., Water Works, Electric Lighting & Power Co. will soon commence the installation of an electric light plant.

Port Jefferson, L. I., N. Y., Electric Light & Power Co. will soon be in the market for $8,800 worth of new electrical apparatus.

The Central City, Ky., Lighting Co. is installing additional equipment and will develop more current for power and lighting purposes.

A hydro-electric power project has been started at Columbia, Ala., by Dr. Frederick Twitty and others. An expenditure of $8,000 is contemplated.

The Crater Lake Co., Crater Lake National Park, Ore., will install a power and electric lighting plant to supply two large hotels which it is building.

Oscar Claussen, St. Paul, Minn., and Charles S. Pillsbury, Minneapolis, Minn., are preparing plans for a proposed municipal electric light plant to

be located at Duluth, at a cost of $700,000.

An electric light plant will be built by the Petersburg, Tenn., Electric Light & Power Co., incorporated with $2,100 capital stock. A. C. Davis, Geo. McAdams and J. A. Montgomery may be addressed.

The city water and light department, Dyersburg, Tenn., will receive bids until June 13 for engines, boilers, generators and switch board equipment for the municipal lighting plant. William Ewell is mayor.

The Indian Valley Light & Power Co., Greenville, Cal., has appropriated a large amount of money for the extension of its power plant, and work will commence in the near future. O. C. Pratt is president of the company.

H. M. Byllesby & Co., Chicago, are at work on a new dam site in the Chippewa river, eight miles north of Chippewa Falls, Wis. It is reported that the company proposes to develop this site instead of the one at Jim Falls, eight miles north.

The Bush Terminal Co., 100 Broad street, New York, has placed an order for the structural material for the power house to be erected in Brooklyn. Details of the company's machinery requirements are not available, but it is understood they will involve a large total.

Ira Beyer and Peter Rowlier, Mishicott, Wis., are promoting the establishment of an electric light and power plant in that village. It is proposed to build a dam across the Mishicott river. Messrs. Beyer and Rowlier have been consulting with the Acker Electric Co., Sheboygan, Wis., in regard to plans and equipment.

New York and Chicago capitalists have secured a charter for extensive power development operations in southwest Virginia. The Appalachian Power Co., Richmond, Va., is the designation of the company. H. M. Byllesby, Chicago, is president; M. A. Wells, New York, vice president; Elmer Dover and R. J. Graff, Chicago, secretary and treasurer, respectively.

New Works

P. E. Hatch is at the head of a company which will erect a factory at Long Beach, Cal., for manufacturing a new gas meter.

J. B. Forbes is at the head of a company which will erect a factory at Long Beach, Cal., for manufacturing rotary gas engines.

The Vincennes Tractor Co., Vincennes, Ind., recently incorporated with $50,000 capital stock, will manufacture gas traction and gas engines.

Preliminary work has been started by the Van Ormer Wrench Mfg. Co., a new corporation, on its proposed new plant to be erected at Trafford City, Pa.

The McComber, Whyte Co., Chicago, has signed a conditional contract to locate its proposed new plant at Kenosha, Wis. The plant is to employ 150 men at the start.

The New York Central Iron Works Co., Geneva, N. Y., which is contemplating the removal of its plant to Maryland, advises that it is not yet ready to announce its plans.

The Aluminum Goods Mfg. Co., Manitowoc, Wis., has awarded the general contract for the construction of an addition to its present plant to the Majestic Construction Co., Milwaukee.

The Muncie Gas Engine & Supply Co., Muncie, Ind., is preparing to erect an addition, which will double the capacity of its plant. The output of oil and gas engines will be increased.

The Buffalo Wire Works Co., Buffalo, advises that it is erecting a four-story building, 35 x 60 feet. The first two floors will be used for office purposes and the upper two will be used for storage.

The Underwood Typewriter Co., Hartford, Conn., has plans for erecting a large factory, and it is understood will require considerable general and special machinery. The structure will be 50 x 200 feet, and six stories high.

The Crescent Tool Co., Jamestown, N. Y., advises that it is having plans prepared for a two-story factory building, 50 x 132 feet. This structure will be in addition to the present plant. The company is not yet ready to give out detailed information.

The Multiple Sign Co., Louisville, Ky., has been incorporated with $10,000 capital stock, and plans the erection of a plant for the manufacture of metal signs. The incorporators include William T. Kendrick, George T. Wood and John C. Hughes.

The Westman Motor Truck Co., 11008-12 Sturtevant avenue, Cleveland, has purchased the Horton plant at Painesville, O., and will move its works to Painesville about July 1. The company is capitalized at $200,000, and will manufacture motor trucks and farm tractors.

The Dudley Tool Works, Menominee, Mich., is being enlarged by the construction of two additions. The company will increase the production of tools. Most of the equipment for the additions has been purchased, but the company is still in the market for some miscellaneous tools.

It has been announced by the president of the chamber of commerce, Yonkers, N. Y., that the Blairsville Enameled Ware Co., Blairsville, Pa., has bought a tract of three acres on the Sawmill river, and will erect a factory. The Eastern Sanitary Mfg. Co. will operate the new plant.

The Massillon Wire Basket Co., Massillon, O., recently incorporated, has purchased the entire property of the Munger Wire Basket Co., and will continue the manufacture of wire baskets for various purposes. The company plans to erect new buildings in the near future, and otherwise increase the capacity of the works.

The Texas Steel & Iron Co., which is expected to incorporate with a capital of $150,000, will erect structural shops at Houston, Tex., which will have a capacity of 1,000 tons a month. The shops will be completed in October or November, 1911. The Texas Steel & Iron Co. is controlled by the Kansas City Structural Steel Co., Kansas City, Mo.

Wade & Scheibel, architects, Youngstown, O., are preparing plans for a plant to be erected for the Universal Auto Truck Co., at Warren, O. The plant will consist of an extensive main shop and smaller buildings for manufacturing purposes, an office, power plant and other structures. It is understood that bids are now being received on a portion of the plant.

An extensive plant will be constructed at Tonawanda, N. Y., by the Spaulding Bros. Mfg. Co., North Rochester, N. H., manufacturers of electrical insulating materials. The company has purchased a plat of 18 acres and plans to erect a structure that will cover about 11 acres. It is estimated that, including equipment, the total outlay will reach about $500,000.

The Goulds Mfg. Co., Seneca Falls, N. Y., advises that it is about to erect four large additions to its No. 2 plant for the purpose of housing its present No. 1 plant. The new buildings will comprise two machine shops, 100 x 300 feet, and a four-story warehouse, 60 x 240 feet. All the equipment to be installed will be motor-driven. The buildings will be ready for use by Nov. 1.

Additions to the plants of the Orenstein-Arthur Koppel Co., at Koppel, Pa., have been completed. The new buildings just completed cover a total of 66,875 square feet, making a grand total of 136,875 square feet. It is expected that when the additional buildings, for which plans are being prepared, are completed, the buildings wil cover approximately 300,000 square feet. A tract of 50 acres is reserved for future extensions. The exten-

sions include: An erecting shop, 300 x 75 feet; a machine shop, 100 x 75 feet; power house, 50 x 37½ feet; storage room, 50 x 75 feet; heavy car shop, 175 x 50 feet, and tool repair room, 50 x 75 feet.

Miscellaneous

The C. O. D. mine, Kingman, Ariz., will be equipped with a hoist.

The Live Oak mine, Globe, Ariz., will install a new pumping plant.

The Choler mine, Virginia City, Cal., will install an air compressor.

The Lautin Piano Co., Newark, N. J., has filed plans for a reinforced concrete factory to cost $75,000.

Armour & Co. will construct a large fertilizer plant at Chrome, N. J. The contract for iron work has been let. and the general equipment will include power and conveying machinery.

Peter M. Androt & Son, Louisville, Ky., are planning the installation of additional equipment in the forging department of their wagon plant, and the purchase of a gas machine for heating and lighting purposes as well.

Government News

Navy Supplies.

The bureau of supplies and accounts, navy department, will receive bids, to be opened June 20, for the furnishing of the following supplies, in the quantities named, for delivery at the naval station designated, on schedule numbered as indicated:

Blocks or bricks, paving, 150,000, Boston, 3660; water heaters, 12, Norfolk, 3668; lavatories and urinals, miscellaneous, Norfolk. 3668; machine, planing, one, Brooklyn, 3672; galvanized steel roofing, miscellaneous, Brooklyn, 3664; bake ovens, ships, nine, Brooklyn, 3668; billy pumps, ships, four, Norfolk, 3668; ranges, miscellaneous, Brooklyn, 3668; blades, hacksaw, 50 gross, Brooklyn, 7,200, Norfolk, 3666; nails, 37,000 pounds, Washington, D. C., 3663; sets, machinists', 22 sets, Boston, 3666; sets, oiler, 20 sets, Brooklyn, 3670; sets, pipe, 12 sets, Boston, 3666; shovels, coaling, 750, Brooklyn, 3670; wire, brass and copper, miscellaneous, Norfolk, 3666; wire, bronze and phosphor, 270 pounds, Norfolk, 3666; bronze, tobin, 10,765 pounds, Newport, 3663; copper, sheathing, 10,765 pounds, Norfolk, 3664; iron bar, 34,000 pounds, Washington, D. C., 3663; iron, pig, foundry No. 1, 100 tons, Philadelphia, 3669; iron, pig, foundry No. 2, 100 tons, Philadelphia, 3669; iron, wrought, 8,000 pounds, Brooklyn, 3669; lead, sheet, 3,840 pounds, Norfolk, 3664; solder, half and half, 5,500 pounds, Brooklyn, 3664; steel, bar, 3,055 pounds, Brooklyn, 3669; steel, billet and bloom, 130,000 pounds, Brooklyn, 3669; steel, carbon, tool, A, 4,000 pounds; B, 6,900 pounds; C, 2,600 pounds, Philadelphia, 3664; steel, hot rolled or forged, 232,000 pounds, Washington, 3663; steel, medium, plate, 41,000 pounds, Brooklyn, 3664; steel, medium, plate, 4,000 pounds, Brooklyn, 3669; steel, rod, drill, miscellaneous, Newport, 3663; steel, sheet, galvanized, 7,100 pounds, Brooklyn, 3664; steel, special treatment, 22,700 pounds, Boston, 3664; tin, sheet, 24 boxes, Boston, 3664; pipe, copper, miscellaneous, Portsmouth, N. H.. 3669; pipe, lead, 825 pounds, Norfolk, 3664; tubing, brass, 5,000 pounds, Philadelphia, 3669; tubing, steel, tool, annealed, 2,370 pounds, Newport, 3663; tubing, steel, 72 feet, Brooklyn, 3669; tubing, steel, miscellaneous, Philadelphia, 3669.

Opening June 27, 1911: Drill, upright, one, Norfolk, 3658; lathe, engine, and gap, one each, Norfolk, 3658; machine, milling and grinding, one each, Norfolk, 3658; crank shaper, one each, Norfolk, 3658.

Bids opened at the bureau of supplies and accounts, navy department, Washington, May 31, were as follows:

LATHE—One 24-inch motor-driven wood turning lathe: American Woodworking Machine Co., New York, $655; J. A. Fay & Egan Co., Cincinnati, $670; Oliver Machinery Co., New York, $730, $645, $655 or $600; Prentiss Tool & Supply Co., New York, $558, $543 or $700.

CARS—Six steel platform cars, standard gage, capacity 5 tons dead weight: E. F. Kirwain Co., Baltimore, $175; Wm. J. Oliver Manufacturing Co., Knoxville, $135.75; Ornstein-Arthur Car Co., New York, $89; Vermilye & Power, New York, $135; Ernst Weiner Co., Philadelphia, $111.40.

INGOT BRONZE—600,000 pounds manganese bronze in ingots, delivery at Washington as required during fiscal year 1911: American Manganese Bronze Co., New York, $0.1396 per pound, alternate delivered by carloads within 30 days of award, $0.1189; Ajax Metal Co., Philadelphia, $0.195; alternate $0.19; American Can Co., New York, $0.1148, alternate $0.1048; Bethlehem Steel Co., South Bethlehem, $0.13, alternate $0.13; Geo. S. Fowler, Washington, $0.1149, alternate $0.1149; Nathan Trotter & Sons, Philadelphia, $0,1086, alternate $0.1059.

PIG IRON—One hundred tons pig iron: Berry & Aiken, Philadelphia, $16.49; Frank Samuel, Philadelphia, $16.90; Thomas Iron Co., Easton, Pa., $17.10.

STEEL PLATES—6,000,000 pounds steel plates and 1,950,000 pounds steel sketch plates, ten pounds and over, for navy collier "Jupiter," delivery at Mare Island navy yard: Carnegie Steel Co., Philadelphia, $153,000; Carbon Steel Co., New York, $172,278.75; Central Metal & Supply Co., Baltimore, $156,030; R. C. Hoffman Co., Baltimore, $166,912.50; Worth Bros. & Co., Coatesville, $176,850.

STEEL PLATES—46,000 pounds steel plates, less thar. ten pounds (for U. S. S. "Jupiter"); Carnegie Steel Co., Philadelphia, $1,034; R. C. Hoffman Co., Baltimore, $1,119.75; Worth Bros. & Co., Coatesville, $1,199.

STEEL ANGLES, ETC.—1,425,000 pounds steel angles, 3-inch x 3-inch 7.2 pounds and over; 1,375,000 pounds steel channels, 6-inch x 3½-inch x 3½-inch x 15 pounds and over and 115,000 pounds I bars, 4-inch x 2¾-inch x 2¾-inch x 3.5 pounds and over for U. S. S. "Jupiter"); Carnegie Steel Co., Philadelphia, $53,809.80.

STEEL BARS—168,000 pounds steel flat bars, half-rounds, square bars and small angles, for U. S. S. "Jupiter": Carnegie Steel Co., Philadelphia, $3,479.52.

STEEL ANGLES—32,800 pounds medium steel angles, black, in 30-foot lengths, as specified for U. S. S. Jupiter: Carnegie Steel Co., Philadelphia, $0.0228 per pound.

STEEL PLATES—194,600 pounds medium black steel plates, as specified for U. S. S. Jupiter: Carnegie Steel Co., Philadelphia, 0.0231 or $0.026697 per pound; R. C. Hoffman Co., Baltimore, total, $4,509.43; Worth Bros. & Co., Coatesville, $4,392.69.

STEEL TANKS—Three steel tanks as per drawings and specifications: S. F. Bowser & Co., Fort Wayne, Ind., $1,497.88; Berry & Aikens, Philadelphia, $1,119; F. S. Banks & Co., New York, $1,036; P. Delaney & Co., Newburgh, N. Y., $1,399; Kenicot Co., Chicago, $1,262; E. F. Kirwain & Co., Baltimore, $1,320; Kittoe Boiler & Tank Works, Cincinnati, $1,350; Jas. N. Motley, New York, $1,475; Oil City Boiler Works, New York, $1,115; Strothers-Wells Co., Warren, Pa., $1,282; Treadwell Construction Co., Midland, Pa., $1,599.

SURFACING MACHINE—One single-cylinder, 4-roll cabinet, double-belted 30-inch surfacing machine: American Woodworking Machine Co., New York, $850; Courtisman Rechtin Co., Cincinnati, $1,140; J. A. Fay & Egan Co., Cincinnati, $1,000 or $960; Oliver Machinery Co., New York, $850, $849, $760 or $729; Berlin Machinery Works, Beloit, Wis., $1,011.

REFINED COPPER—600,000 pounds refined copper, delivered at Washington as required during fiscal year 1911; alternate, 300,000 pounds, delivered within 30 days of award: Ajax Metal Co., Philadelphia, $0.1255, alternate $0.1237; Nassau Smelting & Refining Co., New York, $0.1255, alternate $0.1235; Pope Metals Co., Inc., New York, $0.12¾; United Metals Selling Co., New York, $0.1245, alternate $0.1237.

PIG TIN—20,000 pounds Banca pig tin, delivered at Washington in 12 equal monthly installments during fiscal year 1911; alternate, 5,000 pounds, delivered within 30 days of award: Columbia Smelting & Refining Wks., New York, $0.448; Jas. Clendenin Co., Baltimore, alternate $0.44; Illinois Smelting & Refining Co., Chicago, $0.4375; Nassau Smelting & Refining Wks., New York, $0.435, alternate $0.4425; Pope Metals Co., New York, $0.435, alternate $0.43; Nathan Trotter & Sons, Philadelphia, $0.4295, alternate $0.4395.

ZINC—50,000 pounds slab zinc, 99.96 per cent pure, delivered at Washington in 12 equal monthly installments during fiscal year 1911; alternate, 12,500 pounds, delivered within 30 days of award: Jas. Clendenin Co., Baltimore, $0.0925 alternate; Illinois Smelting & Refining Co., Chicago, $0.07⅝; Nassau Smelting & Refining Co., New York, $0.079; Nathan Trotter & Sons, Philadelphia, $0.092.

CHAIN IRON—103,500 pounds 2¼-inch chain cable iron: Bethlehem Steel Co., South Bethlehem, Pa., $0.04235 per pound; Carter Iron Co., Washington, $0.0425; Standard Chain Co., Pittsburg, $0.0425.

Canal Supplies.

Bids are invited by the Isthmian Canal Commission, Washington, until June 22, as follows:

Eight electric cargo traveling cranes to be installed on wharf at Balboa. Cranes are to be provided with three separate motors to operator on three-phase, 25-cycle, 220-volt A. C., and to have capacity not less than a total horsepower of 250. Hoisting capacity to be at least four tons at a maximum distance of 40 feet from center of crane to center of vessel alongside.

Three locomotive cranes with maximum radius of 30 feet and minimum of 12 feet; to have capacity with outriggers of at least 80,000 pounds at 20 feet radius, and 60,000 pounds at 25 feet radius; and without outriggers of at least 40,000 pounds at 15 feet radius, and 16,000 pounds at 30 feet radius.

One gasoline-driven passenger car with steel body, plating not lighter than No. 12, U. S. standard gage; seating capacity 50 passengers.

32 rock skips, complete, with front and back slinging chains, hooks, shackles and ring, as per drawing No. 6-10-66.

14 perforated tin chaplets.

Bids opened at the Isthmian Canal Commission, Washington, May 26, were as follows:

HAND CARS.—25 hand cars, 5-foot gage, approximate weight 525 pounds, 20-inch pressed steel wheels: Fairbanks, Morse & Co., Chicago, $737.50, shipment in 21 days; George S. Fowler, Washington, $837.50, delivery at Colon in 40 to 45 days.

PUSH CARS.—50 extra heavy, 5-foot gage, platform push cars, 7 feet long, 5 feet 6 inches wide, weight about 500 pounds, 20-inch pressed steel wheels, hub and hub plate drop forgings securely riveted to web: Fairbanks, Morse & Co., Chicago, $1,042, shipment in 21 days; George S. Fowler, Washington, $1,306, delivery at Colon in 40 to 45 days.

WHEELBARROWS.—800 steel tray wheelbarrows, seamless, high-carbon steel, capacity 3½ cubic feet: F. S. Banks & Co., New York, $2,239 or $2,015.20, delivery in 40 days; Jas. S. Barron & Co., New York, $1,784, 45 to 55 days; H. A. Dakin, New York, $2,064, 45 to 60 days; Hibbard-Spencer-Bartlett Co., New York, $1,832, 40 to 60 days; Hubbard & Co., Pittsburg, $5,925 or $6,525, 45 to 90 days; Fairbanks Co., Washington, $1,912, 30 to 50 days; Toledo Wheelbarrow Co., Toledo, $2,200, no time; Universal Trading Co., New York, $1,878.40, 40 to 50 days; Vermilye & Power, New York, $2,360 or $2,080, 30 days; Manning, Maxwell & Moore, New York, $2,400 or $2,176, 30 to 60 days; Norval Shapliegh Hardware Co., New York, $2,400 or $2,480, 45 to 60 days.

HACK SAW BLADES—20,000 twelve-inch hack saw blades: W. Bingham & Co., Cleveland, $665 or $998, 30 to 45 days; R. W. Geldhart, New York, $440, 30 days; Manning, Maxwell & Moore, New York, $550, 30 to 60 days; J. H. Leonard & Co., New York, $734 to $568, 30 days; L. S. Sterrett & Co., Athol, $750, 60 days.

FIRE CLAY—100,000 pounds fire clay: W. W. Clark & Son, Baltimore, $650, at once to 60 days; Walker & Pickett, Kansas City, $600, 40 days; Evans & Howard Fire Brick Co., Saint Louis, $495, 40 days; Gladding, McBean & Co., San Francisco, $800, Ancon delivery in 60 days; Universal Trading Co., New York, $790, 38 days.

(In order to assist the post office in delivering letters to new concerns, it is suggested that the names of incorporators be written in the lower left hand part of every envelope addressed to such new companies.)

New Buyers:—

The following manufacturing companies have filed articles of incorporation:

National Steel Tank & Mfg. Co., Bradford, Ill.; $25,000; by Joseph F. Cody, H. L. Ruhaak and R. D. Lackman.

The Kelley Boiler Co., Wellsville, O.; $20,000; by W. H. Kelley, S. G. Davis, A. A. Weigel, E. S. Noble, and M. T. Abbott.

The Modern Electrical & Mfg. Co., Wilkinsburg, Pa., $20,000; by J. A. Ellis, Elliott Freder and J. E. Margret, Wilkinsburg, Pa.

Ellis W. Morse Co., Binghamton, N. Y.; machinery, etc.; $125,000; by George A. Kent, Ellis W. Morse, W. J. Collins, all of Binghamton, N. Y.

The Central California Machine Works, Fresno, Cal.; $25,000; by B. F. Cathcart, Catharine A. and Gertrude Cathcart, C. M. Heinsen and Sybil A. Heinsen.

The Tiffin Wrench Co., Tiffin, O.; $5,000; by Charles F. Nighswander, George W. Nichter, Arthur Cunningham, H. W. Yeager, J. J. Flick, W. H. Kildore and John C. Loomis.

The Thomas Auxiliary Spring Co., Canisteo, N. Y.; manufacturing automobile springs and shock absorbers, etc.,; $10,000; by Charles L. Thomas, Canisteo, N. Y.; Ernest C. Coulton, Buffalo, N. Y.; Alexander Fleming, also of Buffalo.

Ohio Metals Treatment Co., Cincinnati; to use "the Marsh and Lamon processes for the improvement of the physical properties of metals"; $200,000; by W. T. Judkins, D. Lamon, Thomas S. Bach, Robert M. Fishbach, and E. J. Babbitt.

The Murphy Equipment Co., Manhattan, New York City; to manufacture and sell railway equipment, etc.; $100,000; by Albert C. Murphy, 600 West 142nd street, New York City; John Allen, 523 West 143rd street, New York City; Franklin M. Patterson, 1124 Avenue C, Bayonne, N. J.

The Union Blower & Engineering Co. has been incorporated at San Francisco, with a capital stock of $50,000. The directors are F. H. Bryant, L. F. Holloran, B. J. Whiting.

New Construction:—

The McComber-Whyte Co., Chicago, manufacturer of wire rope, has closed a contract for the location of a plant at Kenosha, Wis.

The Southern Pacific Railroad Co. is planning the erection of shops on the 600-acre tract of land which it owns at Newark, Cal.

The Nova Scotia Steel & Coal Co., New Glasgow, N. S., is planning to erect a forge shop to be equipped with hydraulic forging presses.

The Bogart Gas Engine Co., Buffalo, has increased its capital stock from $25,000 to $100,000, and will build shops estimated to cost $60,000.

The New Britain Machine Co., New Britain, Conn., has taken out a permit to build a new shop, 57 x 160 feet, with a wing 32 x 38 feet, estimated to cost $20,000.

The Wisconsin Engine Co., of Corliss, Racine county, Wis., has decided to erect a new administration building, to cost about $25,000, this year. Plans are now being prepared.

A permit has been granted to the Westinghouse company, Hamilton, Ont., for a brick addition to the machine shop, and an addition to the pattern shop, estimated to cost $65,000.

The Muncie Gas Engine & Supply Co., Muncie, Ind., advises that it is preparing to erect an addition which will double the capacity of its plant. The output of oil and gas engines will be increased.

The King Foundry Co., St. Joseph, Mo., has accepted from the contractor its new building, 80 x 130 feet, and the work of removing the equipment from the former site in Nebraska City, is now going forward.

The Niagara Radiator & Foundry Co., Buffalo, has purchased several acres adjoining its site on Oliver street, on which it proposes to erect the following buildings the coming summer: Two-story warehouse and office building, core room, three-story cupola house, boiler shop, and radiator foundry, and a two-story pattern vault, all to be fireproof.

The Ellwood City Iron & Wire Co., Ellwood City, Pa., will build a second addition to its plant during the summer to care for increased business. The second addition will be larger than the first, and will be located on a lot purchased alongside the present site.

The American Foundry & Supply Co., Asheville, N. C., formerly the Sternberg Foundry & Supply Co., has awarded contracts for three buildings, one-story, of wood, estimated to cost $10,000. The main building for machine shop and storage will be 40 x 200 feet; the foundry, 70 x 70 feet, and the pattern shop, 40 x 50 feet.

Improvements planned by the Reading Stove Works, Reading, Pa., have been partially completed, and the foundry, which was closed down since last September, is operating in full. Electric cranes have been installed in the foundry as well as a new cupola, and the force of molders has been increased from 90 to 135. Other improvements will be completed as fast as possible.

The Massillon Wire Basket Co., Massillon, O., whose incorporation was noted some days ago, has purchased the entire property, including contracts, etc., of the Munger Wire Basket Co., and will continue the manufacture of wire baskets for various uses. The company plans to erect new buildings in the near future and increase the capacity of the works to care for the rapidly growing business.

The plant of the Noble Electric Steel Co., at Heroult, Cal., has been closed down pending the installation of three additional furnaces. The steel buildings are being constructed in San Francisco and will be shipped to the smelter in sections and erected. The installation of the new furnaces includes three transformers of 3,000 horsepower capacity each. Superintendent D. A. Lyon will leave for Sweden this month to study methods of electric smelters in that country.

General Industrial:—

The Warner Screw Co., Detroit, has been adjudged bankrupt by the feder-

al court, and the case has been turned over to Referee Lee S. Joslyn for adjustment.

Independent Stove Co., Detroit, has increased its capital stock from $175,000 to $225,000.

Interstate Metal Co., East St. Louis, has increased its capital stock from $10,000 to $50,000.

The Universal Machine Co., Toledo, O., has increased its capital stock from $25,000 to $100.000

American Roller Screen & Stamping Co., Chicago, has certified to an increase in capital stock from $100,000 to $200,000.

The Fulton Iron Works, St. Louis, has increased its capital stock from $250,000 to $400,000 in preparation for building on a new site.

The Vierling Steel Works, Chicago, has received an order for car frames from the Chicago Railways Co., which will require 700 tons of structural material.

The Yakima Iron Works, North Yakima, Wash., which has been in the hands of a trustee, has been reorganized, with B. T. Tucker as president and O. W. Elder as secretary and treasurer.

The Standard Corrugated Pipe Co. has been incorporated at San Francisco, with a capital stock of $50,000. The directors are S. C. Denson, A. E. Cooley, W. W. Jones, R. G. Pendergast and H. B. L. Denson.

Western Steel Car & Foundry Co., Chicago, advises that the improvement being made in its power house at the Hegewisch plant is an addition to the present plant, the additional equipment for which has been purchased.

The Oregon Iron & Steel Co., Portland, has been awarded by its home city a contract for 1,500 tons of cast water pipe, including 6, 8 and 12-inch pipe. The company will manufacture this pipe at its Oswego, Ore., foundry.

The Stearns-Rogers Mfg. Co., Pueblo, Colo., advises that its recently noted fire damage did not exceed $600 to the building, although some patterns were damaged. The fire did not cripple the concern, its equipment being intact.

The American Radiator Co. has purchased 200 feet on the east side of Hawthorne street, Chicago, as well as a private right of way from the main tract to Crosby street, for $48,000, and will erect on the site a warehouse for its own use.

The International Hoist Co., of Antigo, Wis., has filed an amendment to its articles of incorporation increasing the capital stock from $1,600 to $50,000. The increased capital is to cover the consolidation of the Hoist company and the Pioneer Iron Works, of Antigo, noted in THE IRON TRADE REVIEW recently.

Vincennes Tractor Co., Vincennes, Ind., which was recently incorporated with $50,000 capital stock, advises that it proposes to manufacture gas traction and gas engines. It expects to have its first machine ready for market in the next four months.

It is announced that the removal of the plant of the Reliance Iron & Engine Co., of Racine, Wis., to La-Crosse, Wis., where it will be known as the Sta-Rite Engine Co., will not be completed before Aug. 1. The delay is caused by the building of the new factory.

At the annual meeting of the Bronze Metal Co., New York City, recently, Otis Cutler and Joel S. Coffin were elected directors in addition to E. H. Fallows, R. J. Davidson and Alex Turner. These officers were also elected: President, E. H. Fallows; vice president and general manager, Alex Turner; secretary and treasurer, C. D. Johnson.

Respecting the proposed structural shops to be erected at Houston, Tex., by the Texas Steel & Iron Co., H. A. Fitch, president of the Kansas City Structural Steel Co., advises that it is expected to incorporate with $150,000 capital, the proposed shops to have capacity for 1,000 tons a month. Further, it is hoped to have the shops operating about October or November of this year.

The Cincinnati Machine Co., Cincinnati, whose incorporation was noted recently, has the same officers as the Cincinnati Bickford Tool Co. It will not manufacture, the incorporation merely preserving the name formerly used by Messrs. Tuechter and Schauer as a partnership when building the well-known Cincinnati upright drilling and tapping machines, now a part of the product of the Cincinnati Bickford Tool Co.

The following officers and directors of the Orient Coke Co. were recently re-elected at the annual meeting in Uniontown, Pa.; President, Julian Kennedy, Pittsburg; vice president, Robert Bentley, Youngstown, O.; secretary and treasurer, Reid Kennedy, Homestead, Pa.; assistant secretary and treasurer, R. M. Fry; general superintendent, O. W. Kennedy. The other directors of the company are T. F. Woodman and David Davis, both of Youngstown.

The new building which is being erected at Frankfort, Ind., for the Kohl Mfg. Co. of Indianapolis, has been completed, and the machinery will be placed in operation by the middle of the month. The Kohl Mfg. Co. is removing its plant to Frankfort from Indianapolis. It will manufacture several different styles of auto wind shields, and will conduct a nickel, brass and copper plating plant.

Westman Motor Truck Co., 11008-11012 Sturtevant avenue, Cleveland, has purchased the Horton plant at Painesville, O., and will move its shops to Painesville about July 1. The Westman company has organized with capital stock of $200,000 to build motor trucks and farm tractors, planning to put out 200 trucks this year. The truck and the tractors will be of standard front drive design, except in the use of a powerful universal joint in the front wheel knuckles in order to allow for steering.

The Pittsburg Gage & Supply Co. has just received an order from the Berwind-White Coal Mining Co., Windber, Pa., for three duplex type white oil filters, each of 200 gallons daily capacity. The company recently closed contracts with these concerns: The Bethlehem Steel Co., one multiplex type filter, capacity 1,000 gallons per day; the Republic Iron & Steel Co., for its Haselton, O., plant, one multiplex type filter 500 gallons per day capacity; the Vulcan Iron Works, South Wilkesbarre, Pa., one duplex type filter, capacity 200 gallons daily; the Minneapolis Steel & Machinery Co., one duplex type filter, 2,000 gallons per day. The company has established agencies in Cleveland, Houston, Tex., Tampa, Fla., Nashville, Birmingham, Dallas, Tex., and Augusta, Ga.

Trade Note:—

The Pittsburgh Bridge & Iron Works, of Rochester, Pa., has decided to establish an office in Pittsburg, through which all Pittsburg, Erie and Buffalo work will be handled. This office will be located at 703 Farmers Bank building, Pittsburg, in charge of J. A. McEwen.

The Balbrooke Co., sales engineer and specialist in hoisting and conveying apparatus, with offices in the Machesney building, Pittsburg, has been appointed to represent in that territory the Ohio Grease Lubricant Co., of Loudonville, O., manufacturer of an economic and high efficiency system of grease lubrication for steam cylinders.

Fires:—

The foundry of McFarlane, Thompson & Anderson Mfg. Co., Ltd., Fredericton, N B., was badly damaged May 21, the loss being estimated at $25,000, with insurance for $16,500.